Journal
OF THE NATIONAL ASSOCIATION OF CHIROPODISTS

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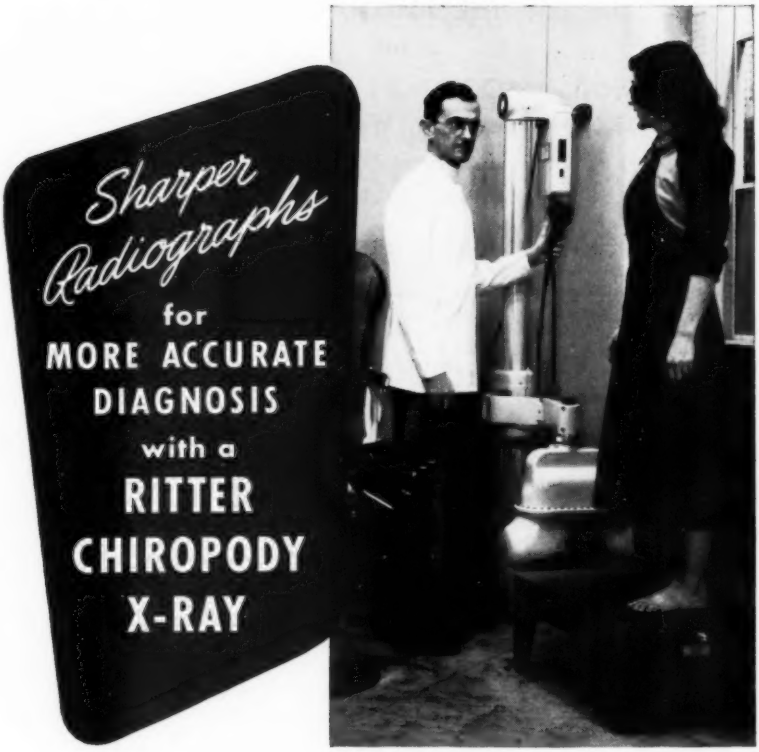

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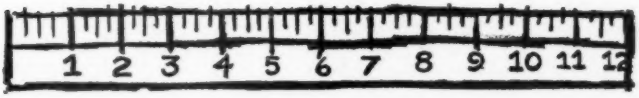

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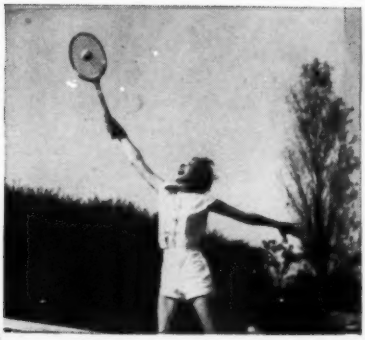

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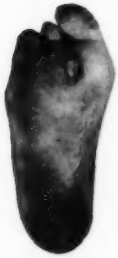

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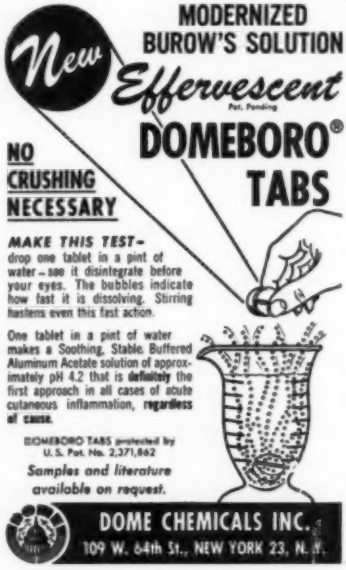
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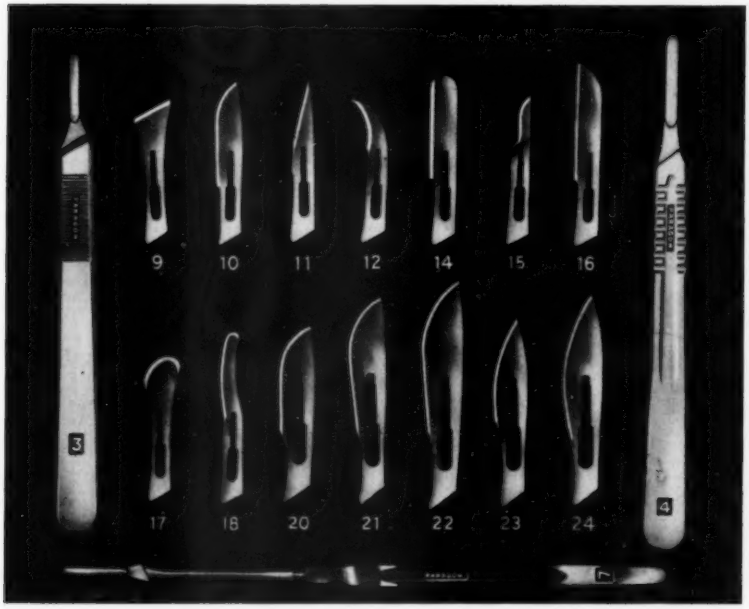

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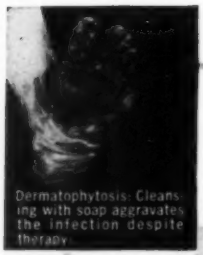

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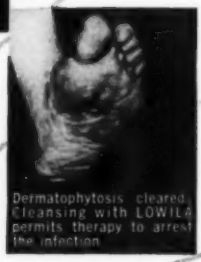

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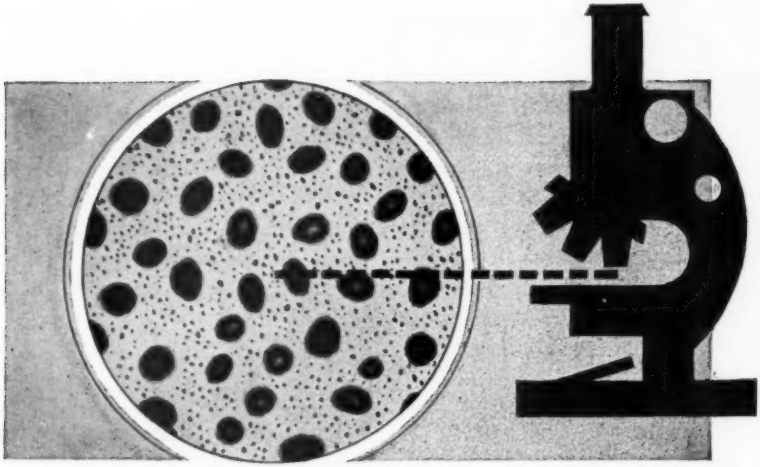

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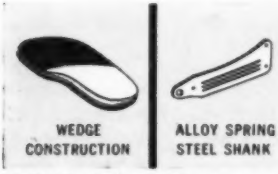

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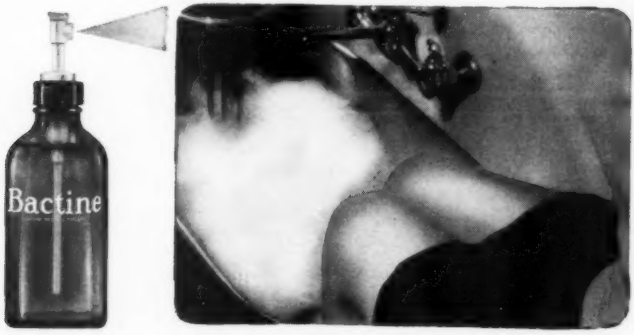

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VOLUME 44 JULY, 1954 NUMBER 7

A NEW METHOD FOR THE TREATMENT OF RESISTANT VERRUCAE

MARVIN D. STEINBERG, Pod.D.
New York, N. Y.

Because of the high incidence of verrucae and the multiplicity of methods of treatment, it is apparent that no one of the currently available methods are completely satisfactory. Treatments range from psychotherapy, electrodesiccation and potential cautery to x-ray or radium exposure.

When verrucae occur on non-weight-bearing or non-traumatized areas, their eradication does not present a serious problem; simple surgery, electrodesiccation or potential cautery is effective. However, even under these circumstances cosmetic results may be an important consideration.

When these lesions occur on weight-bearing areas or on the fingers or face, scarring or other skin changes assume serious import. One does not have to look far to find the frequent tragedies encountered after radiation therapy ranging from chronic dermatitis to extensive necrosis and pre-cancerous changes resulting in loss of limb or life. When one realizes that verrucose lesions are generally radio-resistant and epecially so in the case of mosaic patches, the need for less hazardous and more specific treatments is apparent.

The verruca problem is such a common one that an extensive bibliography or review does not seem to be necessary. Reviews of the literature may be found in the papers by Goodman and Greenwood[1], Niedelman[2] and Montgomery and Montgomery[3]. Excellent reviews are contained in the texts "Diseases of the Skin," by Sutton and Sutton and "Skin Disease," by Ormsby.

The cause of verrucae is thought to be a virus. That they are infectious and of viral nature was demonstrated as long ago as 1907 by Ciuffo[4], who produced them by inoculating the skin with a sterile filtrate of macerated warts. This was confirmed in 1913 by Jadassohn[5] and others.

Incubation periods for the development of verrucae from 4 weeks[6] to 4 or 5 months [7, 4] have been reported. Recently, the presence of spherical virus-like particles in definite crystalline arrangement have been demonstrated in electron micrographs of suspensions of materials obtained from human warts[8]. Verruca may at times occur after such trauma as stepping on a stone barefooted, handling rough paper, etc. This would seem to indicate that a portal of entry is established. Children are more sensitive to the causal agent. In a series of 1,000 cases of verrucae seen by the author, involving the foot, 720 or 72% were in children. It was also observed in this series that verrucae in children are easier to eradicate than in adults. On the other hand, children are more prone to develop new lesions. Of the 720 children treated, 391 or 54.3% developed one or more new lesions while of the 280 adult cases only 43 or 15.4% developed new lesions. A new lesion to be so defined occurred at least 0.5 centimeter away from the site of a previous verruca and obviously was not a recurrence of the same lesion.

Types of Verrucae

Verrucae vary from a single small wart to larger patches of coalesced lesions. A classification of warty growths may include:

1. Verruca vulgaris—This is an elevated common wart with a reddish base. The overlying skin is highly keratinized and it may bleed easily due to the capillary loops that extend high into the upper layers.

2. Filiform warts—These usually occur on the neck, face or torso and present little or no problem. They may be snipped off with a scissors (after pulling them towards the operator with a mosquito forceps). The base may then be touched with a silver nitrate stick.

3. Verruca juvenilis—These occur in crops as small vesicular-like lesions. They may occur rather suddenly and disappear just as rapidly. These are the type of verrucae that respond to psychotherapy or placebo therapy. At any rate, they may be cured routinely by the use of the silver nitrate stick or touching them with phenol followed by nitric acid. They represent no serious problem.

4. Verruca plantaris — Plantar warts are a different problem; they are deeply imbedded and cause severe pain in walking, especially when they occur over weight-bearing points. Most cases of plantar warts occur in children and young adults. They may, however, be seen in people up to 60 years of age or older. In the writer's experience they rarely occur as a new growth in people over 45 years of age. Plantar warts may occur in the mosaic form; these are especially resistant to therapy. In no case should radiation therapy be used on this type of wart. Surgical excision frequently results in recurrence of plantar warts possibly because of spill-over of the virus into the normal surrounding tissues. Even if no recurrence takes place, the resulting scar may cause discomfort and disability. One of the better available methods of treatment is electrodesiccation. Such treatment when properly employed has a low incidence of recurrence. However, healing takes from 5 to 10 weeks and, again, the scar is occasionally painful and keloidal. Obviously, large patches of verrucae are not readily amenable to this kind of treatment because of the sacrifice of large areas of skin. A non-healing ulceration is a possibility and if healing occurs, large painful contracted scarring may result. It should be borne in mind that plantar skin is a highly specialized tissue

and when destroyed cannot be replaced by any other body tissue. Grafting is, at best, a makeshift.

5. Subungual verrucae—These occur under the nails and are very painful and disfiguring. They are difficult to treat. If surgery or electrodesiccation is employed, both the probability of recurrence and deformity of the nail must be considered. An interesting feature about subungual lesions is the frequency with which they are overlooked. On toes they sometimes cause bulbous enlargement of the distal end and being covered by thickened corneum may not be seen. Careful paring of the thickened corneum area reveals small black capillary loops in the softer underlying verruca. This lesion causes severe pain. The overlying nail must be removed to inspect and treat the lesion properly.

Differential Diagnosis

A partial list of conditions which may be mistaken for verruca plantaris comprises calluses, corns, cornified scars, plugged duct sweat gland lesions, keratoses, granuloma pyogenicum, tuberculosis cutis, basal cell epithelioma, squamous cell epithelioma, Kaposis disease, melanoma and radio-dermatitis.

On the foot, quite a number of lesions may be confused with verrucae. The most common confusion exists between these lesions and ordinary seed corns or calluses. Verrucae are rather sharply circumscribed with the exception of mosaic patches and have no papillary lines running through them. After all the overlying thickened corneum is removed, an indurated circumscribed painful mass is still present intradermally. This is not so with ordinary hyperkeratosis. Verrucae have plainly seen dilated capillaries in their surface which bleed easily upon cutting and which are rarely, if ever, seen in other lesions. Verrucae are centrally soft lesions.

Kaposis Disease can be differentiated from verrucae by the chocolate-colored echymoses of the skin preceding the elevation of the lesion. When the lesion is flat on the skin there is no confusion. When a papule forms it may resemble a verruca vulgaris. In any case, when doubt exists, the histology is characteristic.

Granuloma Pyogenicum may be covered with callus when occurring on the plantar surface. It occurs as a single lesion, grows to a size larger than the ordinary verruca and has a distinct strawberry color when exposed. The lesion is in reality an infective granuloma and is covered with pus.

Radiation Dermatitis is easily confused with verrucae and the author has seen such burns diagnosed as verrucae and treated by irradiation. Radio burns are excruciatingly painful, have waxy keratosis, tremendously thrombosed capillaries five to ten times the diameter of thrombosed capillaries seen in ordinary verrucae. Depending upon the stage of the lesion either telangiectasia, acute inflammation, painful keratosis or ulceration may be present. The entire lesion is atrophic and tends to be matted down and adherent with the underlying structures. It is estimated that 25% of these lesions become metastacizing squamous cell epitheliomas.

Benign Nevi are present from birth, are brown in color, may have hair growing from them and produce no pain. They are usually elevated

from the normal skin and are sharply demarcated. They may have a smooth or verrucose surface and either remain stationary in size or grow slowly. They rarely occur on weight-bearing points as verrucae do.

Malignant Melanoma may occur subungually or on any part of the foot. It is almost always blue to black in color, may have a smooth or verrucose surface and tends to slightly infiltrate the surrounding skin with pigment. This treacherous lesion must always be thought of when dealing with a pigmented lesion of the foot. Very rarely the lesion may be amelanotic and non-pigmented. Itching, bleeding and rapid growth are foreboding signs and rapid wide excision by a qualified neoplastic surgeon is indicated. If the lesion proves to be a malignant melanoma, regional gland resections are usually performed. When they occur on toes, amputation of the involved toe should be done with no loss of time. Melanomata of the foot are among the most malignant lesions seen. They may metastasize in the skin and produce satellites only when they occur on the sole of the foot or subungually. Should there be any question of their nature in these locations, removal of the overlying callus will disclose their true nature.

Plugged Sweat or Coiled Glands on the plantar surface of the foot constitute a clinical entity. As the name implies, they are lesions due to the sealing of the normal openings of sweat glands and the retention of bacterially and chemically altered secretion. The lesions are very painful, markedly indurated and occur most frequently on the plantar lateral side of the heel. If all the overlying callus is removed, a thick secretion may be squeezed from the exposed duct. Treatment is surgical excision and suture.

Xanthomas occasionally occur plantarly in both diabetic and non-diabetic patients. They are, of course, yellowish in color, irregular in outline, usually no larger than a pea and are resistant to all therapy but excision.

Modes of Therapy

It is again stressed that ordinary verrucae constitute little or no problem. Those on the dorsum of the foot, the hands and other parts of the body, excepting subungual structures and the sole, may be lightly electrodesiccated, removed with a skin curette or treated with trichloracetic acid, nitric acid or silver nitrate stick. A goodly number will disappear as a result of the drying effect of 5% formalin in alcohol. Salicylic acid is very effective in those verrucae covered with marked hyperkeratosis. It is used in the form of a 60% ointment placed on the lesion, the surrounding skin being painted with collodion or shielded with moleskin with a central aperture. A certain proportion of plantar lesions may be cured in this manner.

Surgical excision may be successful in isolated warts. The scarring and the high incidence of recurrence is objectionable. Obviously, a large patch of verrucae would not be amenable to surgical excision.

X-ray therapy is frequently used in the treatment of verrucae. It is potentially dangerous, producing unfortunate complications in the form of radio-dermatitis. It is hardly conceivable that the risk of producing a radio-dermatitis is worthwhile especially when we know that the response is questionable and that verrucae are radio-resistant. I might further add that not only is the skin irradiated under these conditions

but that underlying fat, blood vessels, tendon and bone are penetrated and exposed to the rays. Since mutatious changes result from exposure to x-radiation, this author believes that x-ray therapy should not be used in these cases.

Cures have been attributed to psychotherapy and countless other forms of incantations and magic. An excellent review of the psychotherapy of warts is contained in a paper by Allington[9]. Since certain juvenile warts are seen to disappear spontaneously on occasion, it might be inferred that any therapy given at the time was responsible for the cure. It must be added that the problem verrucae, the non-responsive lesions which are well-established and have been previously treated, are not the type of verrucae that are seen to disappear spontaneously or through mystic treatments. As stated by Goodman and Greenwood in 1934[1], the lack of controlled investigations and the spontaneous disappearance of warts makes this whole question a confused one.

New Concept of Treatment

The basic concept, in abbreviated form, of this safe and effective new treatment devolves about certain clinical observations, some by the author and some made by others, that some hyperkeratotic disturbances of the skin are related to Vitamin A deficiency. Darrier's disease (hyperkeratosis follicularis) is apparently a hypovitaminosis A. The author has observed that diabetics rarely develop verrucae and in the author's experience, diabetics who are xanthochromic never develop verrucae. Since faulty utilization of Vitamin A is a characteristic of the faulty metabolism occurring in diabetes, a further relationship between Vitamin A and verrucae seems established. It was thought that the Vitamin A skin levels of diabetics would be higher than in non-diabetics.

Work has been done by Aberman and Steinberg[10] on intramuscular and oral ingestion of high levels of Vitamin A with therapeutic failure in the treatment of verrucae. The author has also used aqueous dispersions of high potency Vitamin A preparations by the oral and intramuscular route with consistent negative results.

It was then further reasoned that since Vitamin A is stored in the liver and gastro-intestinal tract in normal people, that it would take enormous and probably toxic doses to effect a substantial rise in skin levels of Vitamin A. Why then, if the vitamin exerts its therapeutic and biologic effects by its local presence should it not be introduced locally? It would seem that a few hundred units introduced locally into the skin would give a higher local level than thousands of units introduced by mouth or by intramuscular injection.

The Vitamin A was injected into the lesions with excellent results; the lesions regressed and were replaced with normal skin and did not recur. Therapeutic cures were obtained in the most recalcitrant and recurrent mosaic plantar and subungual verrucae. Other observers enjoyed the same results. In the first trials solutions of Vitamin A in sesame oil were used. This gave some undesirable side effects such as itching, swelling and hyperaemia lasting for one or two days. These effects were attributed to the oily vehicle and it was necessary to determine what effect sesame oil itself would produce. A test was undertaken in which sterile sesame oil was injected in verrucae. Inflammation,

itching and swelling ensued but in all 6 cases the verrucae remained and continued growing.

Colloidal aqueous dispersions of Vitamin A were used and this substantially eliminated the undesirable side reactions. There was some variability in therapeutic action in the straight aqueous dispersion of Vitamin A and it was deemed advisable to minimize oxidation of the vitamin. Alpha tocopherol (Vitamin E), an efficient antioxidant, was incorporated with the Vitamin A before dispersing in water to inhibit the oxidation and stabilize the therapeutic activity of the Vitamin A. It was also found that the incorporation of a small amount of a fatty oil such as sesame oil, in the aqueous dispersion tended to increase the size of the colloidal micelles of the Vitamin A and thus slow down its absorption by the tissues and keep it in the local area where it was needed. The amount of sesame oil employed was, of course, only a minute fraction of the mixture and hence none of the previous undesirable action of the oil was evident.

The composition of the aqueous dispersion of Vitamin A which had optimum therapeutic efficiency and minimum local irritation is as follows:

Steinberg's Solution for Verrucae[11]

Vitamin A Palmitate	2.96 grams
Alpha Tocopherol	0.40 grams
Sesame Oil	0.60 grams
Polyoxyethylene sorbitan mono oleate (Tween 80)	10.0 grams
Water q. s.	100.0 cc

An aqueous dispersion prepared from this formula has a Vitamin A activity of 50,000 units per cc. It may be ampouled and sterilized by autoclaving before use.

Technique

The technique employed in this injection treatment is important. The steps sequentially described are as follows:

1. Prepare skin as before any surgical operation. The author prefers spraying with ethyl chloride, then swabbing with tincture of merthiolate and drying with a sterile gauze pad.

2. The area is anesthetized with 2% Procaine containing 1-75,000 adrenaline (standard dental solution) using 1.5 to 2.0 cc. A one-half inch, 23 or 25 gauge needle is employed. The injection is made with the point of the needle intradermally and about one-quarter inch away from the base of the lesion. The position of the needle is illustrated in Figure 1, needle 1. It is of utmost importance to avoid intravenous injection of either the anesthetic or the aqueous Vitamin A dispersion. The precaution should always be taken, after the needle is in position but before the injection is made, to pull back on the plunger of the hypodermic syringe; if blood enters the syringe, the needle should be removed from the puncture site and re-inserted in a different location and re-tested.

3. The Vitamin A dispersion is carefully measured into a sterile tuberculin syringe. The injection is made with the needle point adjusted so as to enter the verruca near its base. The Vitamin A dispersion is in-

jected slowly while the needle is gradually advanced into the lesion where one-half or more of the dosage is injected. The final position of the needle is shown in Figure 1, needle 2. The initial dose should generally not exceed 0.1 cc (10/100 cc). The dispersion is injected at dermal level and resistance will be encountered. Inject slowly and after the dispersion is completely injected, allow the needle to remain in place for about one-half minute to allow the material to disperse through the tissue, thereby avoiding leakage of the medicament from the puncture site. A variation on the above technique may be employed in which only one needle puncture is made thereby reducing the possibility of leakage. After the injection of the anesthetic, the needle is left in site and the syringe separated from it. The syringe containing the Vitamin A dispersion is attached and the needle is manipulated into the proper position and the injection then continued.

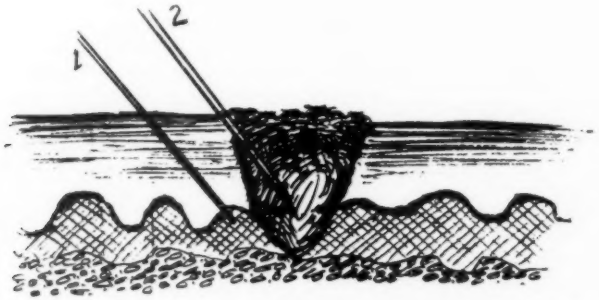

Fig. 1—Enlarged cross section diagram through a verruca in the skin showing positions of needles for (1) anesthesia and (2) Vitamin A injection.

4. Injections are given at weekly intervals. The dosage is increased to 0.2 cc per square centimeter of lesion surface. If the lesion is extensive and covers a broad area the Vitamin A may require injection from several positions in order to obtain effective distribution of the medicament. If reactions such as hyperaemia and tenderness ensue, the dosage should be adjusted downward. A sterile Band-Aid is applied to the site after injection and the patient is permitted to walk and to bathe.

From 5 to 8 injections are necessary for the average lesion. The verrucae disappear in a manner similar to that in which susceptible infections regress after penicillin. The lesions regress completely, the papillary lines reform and no evidence of skin alteration is present. Pain usually disappears after the first or second injection.

Case Histories

Over 200 cases have been treated by this procedure with only 4 known failures. These failures can be attributed to mechanical factors in the form of fibrous barriers due to previous treatments preventing the Vitamin A from diffusing through the lesion or to the unusual consist-

ency of the verruca where fissures and other openings permitted the Vitamin A to escape. Even in these cases there was disappearance of part of the lesion, but because some verrucose tissue persisted these cases were considered failures. In all cases showing cures no recurrences have been seen for periods up to five years. The following are a few typical case histories:

1. Mrs. B., age 32, was first seen March, 1953, with large mosaic patches (half dollar size) involving the plantar surface of all the toes on the left foot and the entire region plantarly of the metatarsal heads. Previous treatment consisting of radio-therapy and potential caustic were to no avail. Patient was uncomfortable and had severe bromidrosis. Weekly injections of the aqueous Vitamin A dispersion were given. 0.16 cc equivalent to 8,000 units of Vitamin A were injected intradermally into the lesions. A new site was chosen for each weekly injection. After the second injection it was quite apparent that the lesions were involuting. They became more superficial, drier and otherwise atypical in appearance. After 12 injections all lesions had disappeared. The areas had been replaced with normal skin and the patient was ambulatory and comfortable throughout the treatment. She continued going to business and only a Band-Aid was worn for one day following each injection.

2. P. A., boy, 10 years old. Large (nickel) size verruca vulgaris on the right heel plantarly. Complete involution and cure after 2 intradermal injections of 0.12 cc of the aqueous Vitamin A dispersion equivalent to 6,000 units of Vitamin A once weekly. The lesion disappeared completely and was replaced by normal skin in about one month's time.

3. Mrs. S. C., age 35, huge mosaic patch involving third and fourth toe plantarly and extending into the plantar surface of the foot. Total of five weekly injections of 8,000 units of Vitamin A given intradermally into the lesions. After the first injection a mild hyperaemia of lesion and surrounding area set in with a slight tenderness. This lasted for 24-48 hours accompanied by slight itching. Following the second injection, the lesion appeared darker in color and the hypertrophied papillae became flatter and less characteristic in appearance. The overlying callus starts to desquamate. On further injections the lesion involuted and after the fifth injection the skin was completely normal and the verruca gone.

4. Mr. M, age 40, multiple verrucae involving anterior plantar surfaces of both feet. There were several patches present where single lesions had coalesced. Previous surgery, electrodesiccation and orthopedic care resulted in recurrence of treated lesions and occurrence of new growths. Injections of 0.2 cc of the aqueous Vitamin A dispersion into the center of the patches and into individual lesions were given at weekly intervals. Several injections were given at one sitting into different areas. Following a total of 16 injections given over a period of two months into both feet, all lesions were seen to have undergone complete regression. No new verrucae occurred. The patient was ambulatory at all times, was able to bathe and wear shoes. No recurrence of verrucae has appeared in over 2 years.

5. Mrs. G., age 35, large patch verruca vulgaris on right outer heel. The size was approximately 2.5 x 2.0 cm. and the patient had the lesion

for over two years. Previous treatment with potential caustics was ineffective and the lesion continued to enlarge. Following three injections consisting of 0.2 cc of the aqueous Vitamin A dispersion at weekly intervals, the lesion was seen to rapidly regress, change to a darker color, desquamate and completely disappear. Complete healing occurred five weeks after the first injection.

In order to properly evaluate the results no other type of therapy was used in the case histories reported. No change in footgear, no strappings, pads or arch supports were prescribed. In all cases the patients were able to continue their normal physical routine with little or no discomfort. They were able to take long walks following the injections and there was no limitation on the patients bathing. Exceptions to this were patients treated early in this work where the Vitamin A dissolved in sesame oil was used for the injections. The substitution of the aqueous dispersion of Vitamin A prepared according to the formula given above substantially eliminated the undesirable reactions.

Summary

An effective therapeutic agent and procedure for the treatment of multiple, resistant mosaic verrucae is herewith presented. Plantar verrucae not responsive to other therapy, subungual verrucae notoriously resistant and difficult to treat have been cured with no objectionable sequellae or complications.

Observation by the author in the relative absence of verrucae in diabetics led to the belief that xanthochromia seen in the diabetic patient may account for the absence of verrucae in these patients. It was further reasoned that the xanthochromia may be composed of Vitamin A or Vitamin A-like products in the skin which the diabetic is unable to metabolize. Since Vitamin A has also proven of value in such diseases as keratosis follicularis or Darrier's disease, a suitable preparation of Vitamin A was prepared and used by injection into the pathological site. This short-circuited the gastro-intestinal tract and liver where Vitamin A is stored and made it possible to develop high skin levels of Vitamin A at the desired site without the necessity of prolonged ingestion till spill-over occurred.

Lesions exposed to such treatment uniformly regressed and disappeared. A technique and dosage schedule was arrived at by clinical trials in over 200 cases and is presented.

The need for such radical procedures as surgery, plastic surgery and radiation are deemed totally inadvisable and unnecessary.

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NEW APPROACH TO THE TREATMENT OF INTRACTABLE VERRUCA PLANTARIS (PLANTAR WART)

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It is not generally appreciated that new growths of the skin on the plantar surface, especially those occurring under the heads of the metatarsals or any weight-bearing area of the foot, often become a major disabling problem. A pebble or nail inside a shoe can make standing or walking next to impossible; a deep-seated callus or residual scar can do likewise, if located under a weight-bearing area. The disability these growths may cause varies from a constant discomfort to complete inability to bear weight over the area. The patient often states that bearing weight on the area is like "stepping on a tack."

That some authorities have been aware of the seriousness of these problems is attested to by the drastic operations they have recommended. Dickson[1] suggests excision of the entire metatarsal shaft, together with dorsal and plantar soft structures covering it, including the toe. In regard to this procedure, a 42-year-old woman was first seen by me in February, 1952, with the complaint of an intractable verruca plantaris under the second left metatarsal head. A few days before the appointed date for surgery, Dickson's procedure was performed elsewhere. I saw her again in February, 1953, when she presented a linear scar studded with multiple clavi along the medial side of the entire shaft of the third metatarsal. She is more incapacitated than formerly (fig. 1). Blair[2] advises excision of the growth and its surrounding tissue and pedicle grafting from a non-weight-bearing surface of the sole of the foot.

Formation of this type of new growth occurs most frequently under the middle three metatarsal heads (fig. 2A). It is in this area that they oftenest become intractable and are usually referred to as plantar warts. It is open to question whether many of these growths are verrucae. I see many seed-like calluses under the plantar condyle surfaces of the metatarsal heads, containing white connective tissue fibers of a reactive fibrosis, secondary to the prolonged trauma of pivotal weight-bearing on a pointed condyle. Such a callus is often diagnosed as verruca plantaris and treated by irradiation, escharotics, electrodesiccation, or surgical excision of the mass. Many patients have been treated by all of these methods. The mass of scar tissue resulting from each type of treatment has been greater than the original excrescence, with increased disability. A comparable but less disabling condition occurs under the head of the first metatarsal and is usually due to an anomalous or hypertrophied tibial hallux sesamoid. New growths are uncommon under the head of the fifth metatarsal, but minor callosities are common.

From the Department of Surgery, Columbus Hospital.

[1]Dickson, J. A.: Surgical Treatment of Intractable Plantar Warts, J. Bone & Joint Surg. 30A: 757 (July) 1948.

[2]Blair, V. P.; Brown, J. B., and Byars, L. T.: Plantar Warts, Flaps and Grafts, J.A.M.A. 108: 24 (Jan. 2) 1937.

Reprinted, with additions, from the Journal of the American Medical Association, July 25, 1953, Vol. 152, pp. 1202 and 1203.

The plantar surface of the head of each metatarsal has two condylar projections. Those of the middle three metatarsals end in sharp points extending proximally (fig. 2B). The condyle on the fibular side is always the larger. Because depression of the anterior arch is nearly a universal malady of civilized man, these condyles assume full weight-bearing function. During walking they bear an added pivotal backward thrust for a short period during each step. This thrust results in the condylar points gouging into the soft understructures. These projections vary in size and shape from one metatarsal to another and in different persons. The plantar condyles of these metatarsals may vary from a mere rudiment to a projection higher than any other weight-bearing point under all the metatarsal heads and from a ball-like surface to a pinpoint (fig. 2B and 2C). The sharper and more projective the condylar points the more the person is subject to fibrotic changes in the skin and subcutaneous tissue of this area. The skin under such a condyle accumulates horny cells as a protective measure, and a vicious cycle is produced: the greater the accumulation of horny layers the less space between the condylar surface and contact area, resulting in further

Fig. 1A—Verruca plantaris under second left metatarsal head before operation.

compression of the soft tissues covering these areas and their gradual degeneration.

Treatment

In the past four years, I have excised thirty-nine plantar condyles of the metatarsal heads of thirty-seven patients, aged 22 to 62 years, with intractable growths immediately under the head concerned. There was complete relief in the majority of cases and marked improvement in all others. Twenty-one (64%) of the patients were women and sixteen (36%) were men. One female and one male had growths bilaterally: in the woman the second metatarsal head of both feet were involved; whereas, in the man the third metatarsal head of both feet, heads were so afflicted. Table 1 shows the frequency of involvement of each metatarsal head. Table 2 indicates the various forms of treatment previously received by the patients in the series.

Surgical Technic

An incision is made immediately over the involved metatarsal phalangeal joint. The skin and extensor tendon are retracted, and the capsule

Fig. 1B—Postoperative view of foot with intractable verruca plantaris under the second left metatarsal head after Dickson's procedure.

is incised longitudinally. In some cases the extensor tendon must be sectioned (fig. 3). The capsule is then retracted with the skin margins, and a vertical incision is made in each side of the joint capsule (fig. 4); this frees the head of the metatarsal so that it can be delivered dorsally. The involved toe is plantar-flexed by the thumb of the surgeon's left hand, while the index finger of the same hand is applying pressure on the plantar surface of the metatarsal. This delivers the head of the metatarsal out of the wound (fig. 5). The plantar condyle is now amputated (fig. 6), and the surface is smoothed and rounded with a Joseph nasal rasp (fig. 7A). The capsule is closed with interrupted sutures (fig. 7B), and the skin margins are sutured.

Report of Cases

Case 1.—The patient was a 54-year-old white male barber. For 10 years he had had a callus under the head of each third metatarsal. About seven years ago the condition was diagnosed as verruca plantaris, and electrodesiccation was employed, without relief. Two years later the growths were irradiated. Increase in size of the growths and resultant disability compelled the patient to give up barbering in 1950, because of inability to stand. Physical examination and routine laboratory findings were normal. In September, 1950, I removed the plantar condyles immediately over the growths. The patient was able to return to work, practice his trade two months later, and is to this day free from pain.

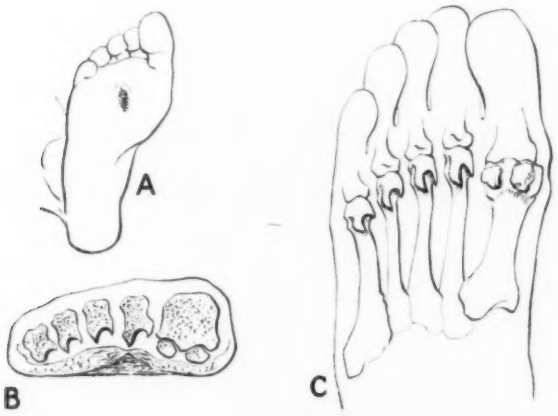

Fig. 2—Location of verruca plantaris in plantar area. A, usual appearance of a new growth or scar under a metatarsal head. B, cross section of metatarsal head 0.5 cm. behind articular surface, showing condylar process. C, plantar view of metatarsal heads. Note that the fibular condylar process is normally the larger.

Case 2.—A 32-year-old white female waitress, in the spring of 1950, noted a growth under the second right metatarsal head which was painful on weight-bearing. The mass was diagnosed as verruca plantaris and excised. It recurred soon after healing of the wound. Some months later it was treated by electrodesiccation; again it recurred, more painful than ever. This was followed by many attempts to destroy the growths by escharotics. She first came under my care Sept. 8, 1952, with the complaint of inability to retain employment because she was unable to bear weight on the ball of her right foot.

On examination I found a cicatrix 2.5 by 1 cm. under the head of the right second metatarsal, whose center contained papillary formation resembling verruca tissue surrounded by scar (fig. 8). The mass was not adherent but penetrated the subcutaneous tissue and fascia. Results of routine physical examination and usual laboratory tests were normal. On Sept. 29, 1952, the plantar condylar surface of the second right metatarsal head was excised. The patient made an uneventful recovery and was able to bear weight comfortably on the ball of her right foot three weeks postoperatively. Since then the mass has almost disappeared (fig. 9), and she is completely free of pain.

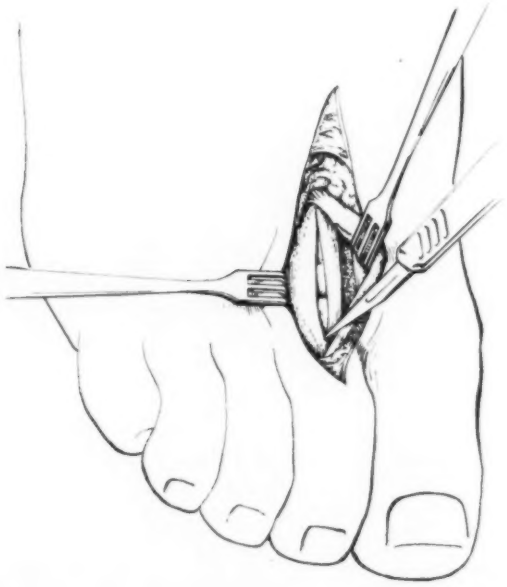

Fig. 3—The skin and extensor tendon is retracted immediately over the metatarsal-phalangeal joint, followed by opening of the capsule.

Case 3.—A 23-year-old white female secretary had growths under each second metatarsal head. In 1948 they were diagnosed as verrucae plantaris and were excised. The growths recurred and were irradiated. Thereafter she was unable to bear weight on the ball of her feet and had to walk on the outer borders. Findings from general physical examination and the usual laboratory tests were essentially normal. Under the second metatarsal head of each foot was a fibrotic mass measuring 3 by 1 cm., which had invaded the subcutaneous tissue and fascia. In August, 1951, I excised the plantar condyles of both second metatarsal heads. The postoperative course was uneventful, and the patient returned to work one month later, able to bear weight on the balls of her feet. She now states, "They bother me only once in a while and then the pain is very slight."

Case 4.—A white woman, aged 55, employed in a newspaper office, had a neoplasm under the right second metatarsal head for four years. She had received acid and irradiation therapy, but the mass had returned after each treatment, larger than the original growth and much more disabling. On April 5, 1949, she complained of severe pain on the ball of the right foot when bearing weight, which was not alleviated

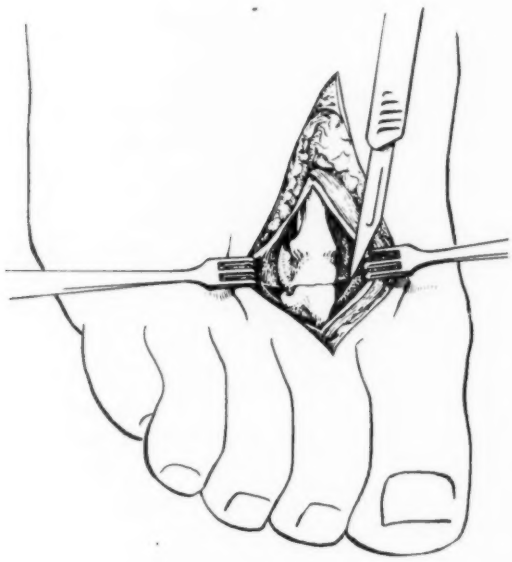

Fig. 4—The capsule margins are retracted with the skin and tendon; the sides of the capsule are then incised. This permits delivery of the metatarsal head dorsally.

by numerous attempts at padding and wearing foot appliances; she consequently had to walk on the outer border of the foot. Findings from physical examination and the usual laboratory tests were essentially normal, and on April 12, 1949, I excised the plantar condyle of the right second metatarsal head. Since then the patient has borne full weight on the foot and requires only occasional palliative chiropodic treatment.

Table 1—Metatarsal Heads Involved in This Series of 39 Cases

Area	*No. of Cases*	*%*
2nd	19	49
3rd	14	36
4th	6	16

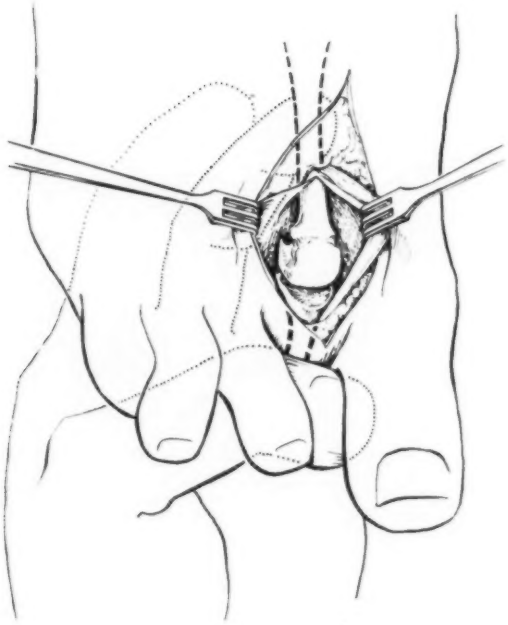

Fig. 5—The toe is plantar-flexed by the thumb of the surgeon's left hand, while the index finger of the same hand presses against the plantar surface of the shaft of the metatarsal involved. This exposes to view the plantar condyles of the metatarsal head.

Table II—Previous Treatment Received

Type of Treatment	*No. of Cases*
Electro-Desiccation Escharotics Radiation Therapy Excision	4
Electro-Desiccation Escharotics Radiation Therapy	7
Electro-Desiccation Escharotics	8
Radiation Therapy	4
Escharotics	5
Excision	2
Electro-Desiccation	3
No previous treatment	4

Fig. 6—The condylar process is amputated with a Horsley cutting forceps.

Summary

Verruca plantaris (plantar wart) and deep-seated calluses occur commonly under the metatarsal heads and often become a major disabling problem. Prevailing treatment often leaves disabling residual scar, and the radical procedures performed on intractable cases produce deformity. A new surgical approach to alleviate this malady is outlined. Twenty-one cases that have been successfully treated by this procedure are recorded.

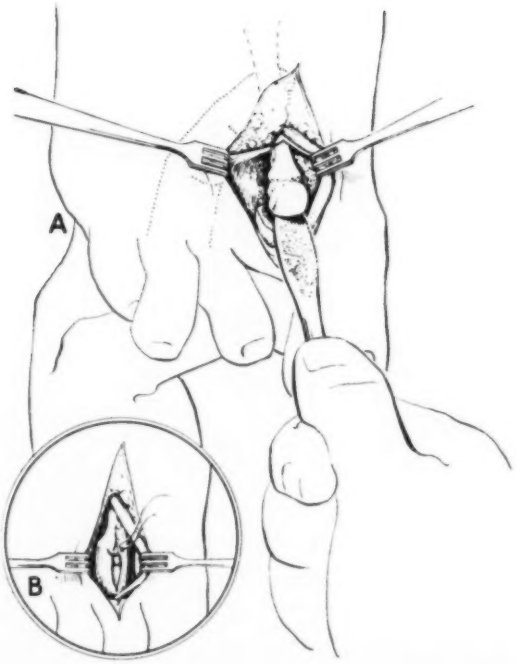

Fig. 7—A, the surface is smoothed and rounded with a Joseph nasal rasp. B, the capsule is closed, and the skin margins are sutured.

Addendum

Since original publication of the above, the propriety of the title, "New Approach to the Treatment of Intractable Verruca Plantaris (Plantar Wart)," has been justifiably questioned; notwithstanding the fact that I stated in the text: "It is open to question whether many of these growths are verrucae."

The title was chosen because of common usage of the term in discussion and in the literature as exemplified by my bibliography. I am now more firmly convinced that mismanagement of this problem has been due largely to faulty diagnosis and erroneous terminology. The condition discussed in the paper has been consistently diagnosed and classified as verruca plantaris, and so treated, with tragic result, that it often becomes intractable from the treatment and failure to remove the etiology. From all the evidence I have been able to obtain, it is my conclusion that intractable types of growth under the three middle metatarsal heads are rarely, if ever, neoplastic, but are rather a reactive

Fig. 8—Photograph of verruca plantaris in case 2, taken Sept. 8, 1952.

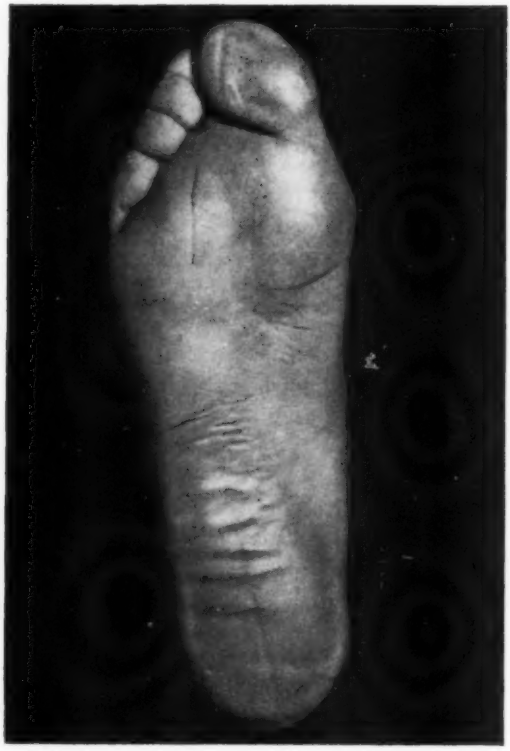

Fig. 9—Photograph of foot in case 2, taken five months postoperatively.

keratosis due to continuous pressure on a pivotal weight-bearing condylar process, resulting in displacement of the epithelium of the skin and subcutaneous tissue by fibrous connective tissue. Extensive invasion of fibrous connective tissue in the stratum corneum may become frayed from friction and appear cauliflower-like resembling verrucae, with the result that it is so diagnosed and mistreated. My experience with this problem has been greatly enhanced since the article first appeared, and the evidence is more clear than ever that amputation of the offending condyle followed by use of a Thomas' Bar or padding to relieve weight-bearing on the keratosis for a few months, will dispose of most all of these cases.

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VERRUCA THERAPY

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In his armamentarium of verruca therapy each must develop a proficiency of several methods. When one method fails another must replace it. Complicating our problem is the desire to resort to methods which will destroy the growth of the verruca and at the same time permit active weight bearing on the area under treatment.

We have reviewed the literature and have attempted to clinically evaluate each of the methods worthy of trial. Peculiarly in some instances we could not substantiate reported cure rates, and similarly, the cure rates which we obtained occasionally exceeded the reported rates. This is understandable. Until more information is available about warts —why they occasionally disappear spontaneously and why they resist or respond to the variety of therapies—a true evaluation is impossible.

The multiplicity of therapeutic measures against plantar verrucae practiced today is ample evidence that no one modality can be considered completely satisfactory. The merits of each method have been widely discussed yet the specific treatment is wanting and verruca management frequently remains a difficult and distressing therapeutic problem.

Warts are benign tumors. They are best described as papillary, circumscribed, epidermal and autoinoculable growths of variable size, shape and consistency. They are very common and are not affected by age, sex, race or mentality. They occur single or multiple.

Several clinical forms are recognized. All possess the same essential histological characteristics. We in our profession are concerned primarily with plantar mosaic and vulgaris warts.

Warts are infectious and of a virus nature. Their infectious characteristic is suggested by their occasional occurrence in epidemic form. The appearance of warts in linear arrangement along a scratch mark and on opposing surfaces of the phalanges (kissing warts) suggests their inoculability.

Our reported findings are based upon published and unpublished experimental evidence and practical experience. In analyzing each treatment method we were impressed by:

1. Patient tolerability.
   a. Degree of pain production.
   b. Degree of incapacitation.
2. Ease of therapy.
3. The cure rate.

Six consecutive months of semi-monthly examination was arbitrarily chosen as the criterion of cure.

Treatment methods are flexible. Many variations of each method and combined methods are reported with equally good results.

Therapeutic measures generally fall into one of several categories.

I. CHEMICAL TREATMENTS

A. Local

1. *Salicylic Acid*—Of all the keratolytic agents employed, salicylic acid has gained and retained the highest degree of popularity. It has been used in strengths up to 70 per cent and has been incorporated as a plaster

application, in lotions, suspended in flexible collodion, as an ointment, in aperture pads and in combination with other medications.

Its most effective application is one long popular in chiropody but recently reported in the medical literature as the Blank[1] method. Briefly it is as follows: following the reduction of the overlying callus, a drop of 90 per cent phenol (so-called "liquefied crystals of phenol") is carefully applied to the top of the wart. Then, a drop of "fuming" concentrated nitric acid is applied directly over the phenol. A slight sputter is heard as the lesion turns dark brown.

An aperture pad is then placed around the verruca and a small amount of 60 per cent salicylic acid in petroleum is placed within the aperture.

The entire dressing is then covered and secured with strips of adhesive.

The entire procedure is repeated at five to seven day intervals.

The number of treatments is a variable factor and are concluded only when there is a smooth continuity of skin, disappearance of the "capsule," absence of the papillae in the center of the lesion and disappearance on palpation of the firm tender nodule composing the verruca.

Blank reported a cure rate of 95 per cent. We too find our statistics produced a comparable high rate of cure and an average number of four treatments.

2. *Podophyllin*—In recent years we have seen a wider acceptance of the use of podophyllin. Podophyllin possesses the ability of dissolving mitotic figures and also dissolves the tissue around it.

Kurtin and Yontef originally described the use of podophyllin. They suggested the reduction of the corneous upper layer of the wart until bleeding points were encountered. Pressure is then maintained with gauze until the bleeding stops. Following the protection of the surrounding skin with collodion a drop of podophyllin suspension is placed on the area under treatment and covered with a 2″ strip of well-flamed adhesive tape. On the eighth day the tape is removed and the resultant gray friable substance is scooped out. Podophyllin is reapplied and the procedure is repeated. Following a few such treatments a clean hole will be seen which will heal rapidly. Despite the reported painlessness of this procedure we have encountered severe pain in each case we have treated.

We can however confirm the reported cure rate of 60 per cent.

Variations of this method have been described. The daily use of:

℞

Podophyllin resin	25%
Salicylic acid	25%
Tr. Benzoin Compound	q.s.

painted on the wart and covered with adhesive daily also produces results within 3 to 7 days—but here too severe pain is usually encountered.

At our clinic we have been using an original method devised by our chief, Edmond Edelson, M.D.,[2] antedating the aforementioned procedures and with the same degree of effectiveness. It employs podophyllin resin in a suspension and has proven the most satisfactory method of therapy utilizing this drug. It consists of the daily application by the patient of:

℞

Podophyllin resin 5-10%
Salicylic acid 10-15%
Resorcin 10-15%
Acetone 20%
Flexible collodion q.s. 30.0

This medication is applied with a wooden applicator twice daily. The previously applied layer need not be removed before each application. The area under treatment is pared down each week and it appears fairly certain if this preparation will be effective, the complete liquefaction of the wart will occur within three weeks. Pain in this method is generally minimal, there is no incapacitation and dressings are not necessary.

3. *Pyrogallic Acid*—This agent too has gained fairly popular use. Prepared thusly:

℞

Pyrogallic Acid 50%
Chloral Hydrate 5%
Anesthesin 1%
Petrolatum .....q.s.

it is applied on the verruca within an aperture pad surrounding the verruca and repeated at 5 to 7 day intervals. It is less painful than many of the common treatments and proves effective. The reported rate of cures range from 80 to 90 per cent with an average of four treatments necessary.

4. *The Acetic Acids*—Used in any of its forms, Trichloracetic, Bichloracetic or Monochloracetic, the technique of application is the same. The overlying callus over the verruca to be treated is reduced; then a pointed applicator or toothpick is immersed into the solution and applied to the verruca. A small adhesive and gauze coverlet is used over the treated area. This procedure is repeated at weekly intervals. It is comparatively painless and yields a cure rate of 75 per cent over an average period of 5 to 8 weeks.

5. *Silver Nitrate* in 100 per cent concentration is similarly used.

6. *Glacial Acetic Acid* and *Lactic Acid*, used in equal parts, are also applied to verrucous lesions.

In each of these methods the surrounding skin is protected with petrolatum.

7. *Formalin*—We do not especially recommend the use of formalin because of the occasional unpleasant reactions, our low percentage of cures and the prolonged treatment time necessary.

Formalin in solution is quite unstable and the preparation originally quite potent resolves within a few days to merely the vehicle.

Hence we feel the high reported cure rates reported by some investigators using formalin includes a percentage of psychotherapeutic cures.

Lynch and Karon[3] used 15 gms. of a mixture containing 3 or 4 cc. of formalin in aquaphor, and where the lesions appeared resistant the formalin was increased to 6 cc.

This ointment is rubbed gently onto the verruca with a cotton-tipped

applicator twice daily for a week or two, then once every 1 to 3 days, often enough to keep the tissues hard. No dressing is needed. The surface is reduced every week or two by the doctor.

Lynch and Karon claim warts were eradicated in 32 of 56 cases. In this same series plantar warts were eradicated in 68 per cent of those treated.

We have been unable to produce a cure in any one of seven patients.

8. *Fuming Nitric Acid, Concentrated Hydrochloric Acid, Aqua Regia, Carbolic Acid, Chromic Acid*—These have been used through the years as local applications on verrucous areas. The major objection to this method is the tendency of each to produce scars which are keloidal in nature and the inadequate control inherent in chemical applications.

9. *Euphorbium Resin*—Goldblum and Curtis[4] have recently reported the newest therapeutic approach. We haven't had time to evaluate this method but we shall include it with our findings.

Following the reduction of the callus over-lying the verruca, a 30 per cent suspension of Euphorbium resin in a 90 per cent alcohol is applied to the center of the lesion. It is covered with adhesive and remains so for 48 hours. Wetting the feet is not permitted. Following this period the verruca is again reduced and the suspension is again applied. They claim that in most instances cures were effected within four days. Some were under treatment for six days before the verruca was destroyed. They claimed good results in 60 per cent of their patients.

10. *Crystalline Potassium Permanganate*—Another reported treatment, not too popular, originated in France and employed crystalline potassium permanganate. The wart is reduced until capillary bleeding is produced. Then crystalline potassium permanganate is packed into the wart area and held under pressure until the bleeding has stopped. It is then covered with a dry dressing.

Potassium permanganate is a cauterizing agent. Investigators have reported 60 to 80 per cent cures. We have endeavored to use this method in three cases and have yet to accomplish a cure. We have however been impressed by the accompanying painfulness.

11. *The Antibiotics*—Many had anticipated but few have reported good results with the local application of the antibiotics: Aureomycin, 3 per cent crystalline ointment; chloromycetin, 1 per cent cream; neomycin; bacitracin, terramycin and penicillin cream or ointment.

It was advocated[5] that either one of the preparations be rubbed into the verruca and then covered.

We have repeated several attempts with the varied preparations and have yet to produce our first cure.

12. *Acid Nitrate of Mercury*—To complete the list of more popular chemical methods and to lead us into a discussion of the surgical methods, it is apropos to discuss a combined surgico-chemical procedure devised by and used in our clinic[2].

The use of acid nitrate of mercury (Cambridge Pharmacy, New York) produces a fine supple type of scar in a combined surgical and chemical procedure. Following local anesthesia with 2 per cent procaine, excision and curettage, an applicator dipped into the solution is painted over the exposed area. After the chemical has been allowed to act for five minutes, neutralization is obtained by packing the cavity with powdered bicarbonate of soda.

The acid nitrate of mercury must be a fresh, clear semi-viscid solution. The rate of cure approximates 75 per cent.

B. Systemic

1. *Vitamin A*—The results produced with Vitamin A therapy used locally or orally was discouraging.

Since warts are growths due to proliferation and not keratinization we neither anticipated nor obtained a favorable rate of cure.

2. *The Antibiotics*—The systemic administration of the antibiotics, either orally or parenterally, has shown no success against verrucae.

It is interesting to note the results reported by Beinhauer and Gibson[6] following a study with the local injection of aureomycin and the oral administration of Duomycin Hydrochloride (Lederle). The local injection therapy with antibiotics of verrucae vulgares was accompanied by severe local reactions and the response to aureomycin oral therapy "was not favorable."

3. *Heavy Metal Therapy*—Mercury and arsenic proved to be a dangerous approach and in all probability, aside from its possible psychological effect, it is of little value.

Bismuth intramuscularly seems safer and of more value.

Lurie[7] has reported good results with the intramuscular injection of Bismuth Subsalicylate in a 10 per cent suspension of vegetable oil. This is injected once a week, 1½ to 2 cc. for men and 1 to 1½ cc. for women through a 21 or 22 gauge needle.

It may be helpful to combine this with any other method of treatment.

For similar action through oral dosage, Bistrimate tablets can be just as effective. In adults the recommended dosage is 1 or 2 tablets three times a day and in children ½ tablet three times a day. This may be continued for six weeks. The patient may complain of a black stool, a little gas or discomfort.

Bistrimate tablets can be more toxic than the intramuscular administration of Bismuth.

4. *The Biberstein Method*—The Biberstein method theoretically is one of immunotherapy. Dr. Biberstein[8] reported 75 per cent cures. The technique consists of novocainizing the area, cutting off the warts, making a suspension of the wart material in saline, inactivating the suspension and then injecting it in small doses.

Cures were reported following 2 to 30 injections.

Reports have it, however, that too often warts appeared at the site of injection.

II. SURGICAL METHODS

A. Surgical Excision

The surgical excision of plantar verrucae is a popularly practiced method of correction.

There is a great variance in reported rates of cure ranging from 40 to 90 per cent, but most authoritative investigators claim only a cure rate of 50 per cent.

Following local procaine 2 per cent anesthesia of the verrucous area, it is excised with either two elliptical incisions and sutured or by circular excision which is allowed to heal by granulation. You must cut widely and deeply enough to allow free bleeding—not oozing.

This technique allows for quick healing but the post-operative pain, scarring and frequent recurrence with the resultant scar often worse than the original wart makes me feel surgery is impractical for verrucae on the plantar of the foot.

B. Electro-Cautery

1. *Electrodesiccation* and *coagulation* advocates all report high cure rates, and we in our study can readily confirm a 90 per cent rate of cure. This method is a popular one, but it has its disadvantages. The slow healing period, the continued bandaging and the inconvenience to the patient for 4 to 7 weeks and the scarring and occasional keloid formation do not make it an ideal approach.

A small cold spark is ample for treatment. Following local anesthesia with 2 per cent procaine the spark should be applied only until the lesion becomes luminescent. Continued sparking causes unwarranted destruction of tissue. The desiccated area is then removed, usually with a curette and generally without bleeding, and a bland or antibiotic ointment dressing suffices.

2. *The Karp Method.* Dr. Karp[9] in presenting this method reported a 94 per cent cure rate.

A platinum loop off the short wave current, following analgesia, is inserted into the center of the lesion, rotated 180°, and removed. It is inserted to the base of the verruca. There is no bleeding and no tissue is removed. The plug separates and is expelled as healing progresses and there is complete healing within 4 weeks. This is a comparatively painless method and does not incapacitate the patient. The result is accomplished by searing the base of the wart from its blood supply.

3. *Electrolysis*—Negative galvanism has not proven a popular method with most of us; however, there are some chiropodists who claim this to be the method of choice.

We personally have found it to be of no great value.

C. Cryotherapy

The escharotic effect of cryotherapy, produced by the use of solid carbon dioxide, was first described in 1907 by William Allen Pusey. Its application to the treatment of warts has yielded a safe, efficient and simple method.

The degree of freezing the tissue with a carbon dioxide snow pencil at −70° C depends upon the time of contact with the lesion and the pressure exerted. We have found in a prolonged study[10] that the average treatment time was 60 seconds with extremely firm pressure, and repeated at two week intervals for three treatments. Following each exposure a simple coverlet is applied.

On occasion the patient may return with a painful bulla with the verruca "floating" within it. Drainage relieves all symptoms and effects the cure.

We have reported a 91 per cent rate of cure and were particularly impressed with:

1. The ability to retain the patient who is afraid of surgery, injections or prolonged treatments.

2. The patient loses no time from school or work.

3. With the exception where a bulla develops that requires opening, the patient can bathe, go swimming, and continue his normal routine in complete comfort.

4. The speed of application, the elimination of bandages, the convenience to the patient and the high percentage of favorable results make cryotherapy an efficient chiropodic therapeutic modality.

D. Local Injection Therapy

The treatment of verruca by local injection therapy is effected by the use of:

1. Necrotizing solutions—require a local anesthesia in advance, and produce sterile abscesses resulting in subsequent white connective tissue organization.
2. Sclerosing solutions—usually have a local anesthetic already incorporated, and by infiltration between the tissue cells cause an induration and contraction with the subsequent formation of fibrous connective tissue.

The sclerotics offer a wider margin of safety with less side reactions. The more popular sclerosing solutions used in chiropody[11] include:

1. Quinine and Urea Hydrochloride (¼ to ½%) (E. W. Cordingly; Clinton, Ind.)
2. Quinine Hydrochloride and Urethane Solution (E. W. Cordingly; Clinton, Ind.)
3. Bismuth Sodium Tartrate (1.5%) (R. H. Gross, N. Y.)
4. 5% Ethyl Alcohol in 2% Procaine Hydrochloride (L. E. Markowitz, N. Y.)
5. Varisol (Abbot Labs.) (Joseph S. Bowman, Lebanon, Pa.)
6. Quinocaine (Farnsworth Labs.)
7. Benzyl Alcohol (1 to 6% sol.) in 2% procaine.
8. Sodium Morrhuate (5% sol.) in 2% procaine.
9. Sotradecol 3%. (Wallace and Tiernan)[12].

Generally speaking the technique follows a similar pattern[13]. Using .05 to .5 of a cc. in a tuberculin syringe with a ¼ inch 24 or 25 gauge rustless intradermal needle, the solution is injected into the previously anesthetized area (with 1 to 2 percent of 1 to 2 cc. procaine) reaching to the depth of the base of the wart. The injection is made intradermally for if it is made subcutaneously absorption will take place and the local effect is lost.

The patient is again seen in 5 to 7 days. One to three such injections are usually necessary to effect complete involution of the wart.

The pain, uncertain results and repeated injections required do not make this approach an ideal choice of therapy. Cure rates reported range from 75 to 90 per cent.

III. RADIUM AND X-RAY

Radium and x-ray are used by many dermatologists and by some chiropodists where their state laws permit its use.

X-ray and radium treatments are destructive measures, but the amount of destruction can be regulated.

Radium is not employed as popularly as is x-ray. The established danger of this element and the fact that cure rates produced range only from 50 to 70 per cent do not invite its general use.

X-ray too offers only a 50 to 70 per cent rate of cure. It is true x-ray is painless, the skin is unbroken and no dressings are required, but this is all over-shadowed by the danger of producing a radio-dermatitis. Most doctors advocate only one exposure. Its action is the destruction of nuclear protein. It tends to inhibit the growth of the neoplasm until it liquefies. This is a gradual autolysis.

The number of dosages vary with one's technique. Some advocate one treatment only. Others give a lesser dose and follow with other treatments with slightly smaller exposures. These as a rule do not exceed three treatments.

The action of radium is similar but the technique varies.

IV. ORTHOPEDIC CARE

Along with your choice of therapy, relieving the weight bearing over the verrucous area will not only diminish the pain but will often bring about a cure.

Eden[14] reports excellent results with the use of a leather insole, inserted in the shoe and thus worn for one week. Following this period, the insole is removed and the pressure points are noted impressed upon the insole. Aperture pads, crescent pads or metatarsal raises to effect relief of pressure are then cemented to the insole and re-inserted into the shoe—usually to the satisfaction of the patient.

V. PSYCHOTHERAPY

The varied methods practiced in the psychotherapeutic approach are unending. Suggestion however is not as effective on warts of the feet as on other parts of the body.

Most investigators can report only about a 25 per cent cure rate, and since that rate holds with spontaneous disappearance of warts, some are tempted to believe that a relationship exists.

Since Jadassohn, whose investigational background is exemplary, reported a 75 per cent psychotherapeutic result, many have accepted this means as a valuable therapy.

I am tempted to believe psychotherapy has its place in selected cases. I have often seen patients in whom warts have disappeared during the interval between the first visit and the date set for removal of the wart a week later.

The success of psychotherapy depends on it being administered in such a manner that neither the patient nor any related individual know it is psychotherapy.

As we have already stated, the varied methods in the psychotherapeutic approach are unending[15], so let us review a few of them:

1. Pressing or rubbing the wart with a piece of apple or pork and then throwing away or burying the material. The warts are expected to disappear when the material used has rotted. The stage of the moon is often considered an important factor.
2. In North Africa the warts are exposed to lightning and magic incantations.
3. The blood of a hedgehog applied to the wart is listed as a cure.
4. Mark Twain relates the discussion of Tom Sawyer and Huck Finn about the relative merits of using "spunk water" on a wart in the middle of the woods at midnight as compared with burying a bean, half of

which is covered with blood of a wart, at a cross-roads at midnight in the dark of the moon.

5. Disposing of a dead cat in a graveyard at midnight where someone who was wicked is buried has been recognized as a cure for warts.

6. The application of castor oil, iodine, bleaching solutions, saliva, urine, or the juices of various plants and weeds all have their advocates.

7. Mild electric shocks, saline injections, painting warts with any colored solution, using colored lights or noisy machines also are credited with curing warts.

8. This unending list should also mention the waving of magic wands, the wearing of magic ribbons, buying the warts from the patient and outlining the part with the wart on a piece of paper and then burning the paper.

Mosaic Verruca

Mosaic verruca persist in puzzling the chiropodist and dermatologist. They usually occur on the plantar surface of the foot but may be found in the interdigital areas.

The Montgomereys first labeled them "mosaic" in 1928 because of the pattern created by their appearance. They vary in size, are irregularly bordered and are usually painless. Brezak[16] has stated that they usually occur with hyperhidrosis and with verrucae on the hands.

Most mosaic verrucae are radio-resistant.

Electro-surgery may sometimes give good results but again, their location on weight bearing surfaces invites the danger of a painful scar.

Wright[17] advocates the application of a saturated solution of silver nitrate with a swab to the wart following reduction of the callus until capillary bleeding is encountered, and protecting the surrounding area with vaseline. He believes this method is specific with excellent results following 5 to 10 consecutive applications at weekly intervals.

We can report some good results with the daily application of chemically pure Aqua Regia. Every seven days the eschar is reduced with a scalpel, and with continued therapy a good result is accomplished within 3 to 4 weeks. There is no interference with bathing habits, it is painless and simple dressings make this a favorable modality, but the greatest disadvantage is the necessary use of aqua regia at home by the patient.

We have also seen effective results with the daily use of 10 per cent salicylic acid and 10 per cent resorcin in flexible collodion.

The Montgomerey method of applying 40 per cent salicylic acid plaster cut to the size of the lesion each week following the debridement and touching up the area under treatment with either monochloracetic acid and/or silver nitrate 60 per cent. Despite the popularity of this method we have been unable to clear any mosaic verrucae with it and have been successful only in producing pain.

Turchin[18] recommends the use of 40 per cent salicylic acid for one week, then with a fairly firm hand brush, scrubbing for 3 minutes daily for the next week and thus continuing alternately may bring about a cure in 6 weeks.

We have had some success with this method but found that results are more favorable when the area is first painted with Bismuth violet prepared with salicylic acid and benzoic acid (Tablerock Laboratories, Greenville, N. C.).

There are innumerable methods using each of the aforementioned chemicals discussed in this paper, but we will describe just one more that has produced good results although some patients experienced painful reactions that were controlled by warm saline soaks.

The lesions are first touched with bichloracetic acid and then painted with a lunar caustic stick. This is repeated each week and within one to three weeks the desired result is produced. A simple dry dressing is used to cover the treated area and the patient is advised not to wet the part for 48 hours.

Conclusions

Verrucae are one of the paradoxes of medicine. The multiplicity of therapeutic measures practiced today is ample evidence that no one modality can be considered completely satisfactory.

With the many methods we have reviewed and with those we have omitted, no single method is effective in every case. No matter what method is practiced recurrences will be encountered.

Any surgical removal, whether local removal or electro-surgical, if carried out on a weight-bearing area, may result in a scar which may be more painful than the wart itself. These methods should be employed on non-weight-bearing areas only.

We must have an understanding and become proficient with several methods, so that if one method fails another must replace it. Until a specific remedy for warts is available, the treatment will at times continue to be a difficult and distressing problem.

In the final analysis, to quote Samuel M. Peck, M.D., of New York, "The best method is one you know best and the one which gives you the best results."

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INDUSTRIAL FOOT HEALTH SURVEY*

IN ORGANIZING a foot health program in a new production unit a sample survey was made with the following results:

A group of fifty employees was chosen for the purposes of this survey. In an attempt to be impartial this group was composed of the first fifty employees reporting for treatment to the foot clinic who could satisfy two requirements:

1. Must have been in company service during the entire measured period.
2. Must have requested foot treatment of their own volition—not asked to come to clinic by any medical department personnel.

No consideration was given to any other factor such as age, length of service, type of work, etc.

A study of accident records revealed the following:

1. During the forty-five months measured the average number of accidents per employee in the industry as a whole was 3.55%. The special group of fifty had an average of 4.76% accidents per employee during the same period.
2. The absenteeism rate per employee in the special group of fifty was lower than in the industry as a whole.
3. A greater percentage of the special group had purchased safety shoes than the percentage of men in the industry as a whole. However, a smaller percentage of the special group wear safety shoes after purchase than do the men in the industry as a whole.

While the number of employees involved in this survey are perhaps not large enough to be statistically valid certain implications may be drawn that are in agreement with our observations.

1. Foot disability is a factor in the individuals' safety record. It is felt that this is traceable to decreased worker attention.
2. While we feel that foot disability plays an important part in fractional and collateral absenteeism it does not appear to be significant in complete absenteeism.
3. Safety shoes, as designed today, cannot be comfortably worn by a significant number of industrial foot sufferers.

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*From address to Annual Meeting of National Safety Council—North Carolina Section—Raleigh, N. C., May 6, 1954—delivered by George F. Holt, D.S.C., as a representative of the Occupational Health Services, Asheville, N. C.

JOURNAL

OF THE

NATIONAL ASSOCIATION of CHIROPODISTS

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DR. WILLIAM J. STICKEL, *Editor*
3500 FOURTEENTH STREET, N. W.
WASHINGTON 10, D. C.

Address all communications intended for publication, matter relating to advertising, business or subscriptions to the Editor.

N.A.C. CONVENTION FEATURES OUTSTANDING MEDICAL SCIENTISTS

Among the authoritative lecturers scheduled to appear on the N.A.C. Scientific Program are two outstanding medical scientists. R. W. Gifford, Jr., M.D., Consultant, Section of Medicine, Mayo Clinic; Instructor in Medicine, Mayo Foundation, Graduate School, University of Minnesota. Diplomate of the National Board of Medical Examiners; certificated by the American Board of Internal Medicine.

Cleveland J. White, M.D., is Chairman of the Department of Dermatology, Stritch School of Medicine, Loyola University; former member of the Department of Dermatology at Northwestern University and of the Mayo Clinic; also Dermatologist-in-Chief at the Mercy Hospital in Chicago; consulting dermatologist at the West Suburban, Oak Park Hospital, Resurrection Hospital and Norwegian-American Hospital.

N.A.C. SCIENTIFIC PROGRAM AUGUST 15-16-17, 1954 — DRAKE HOTEL, CHICAGO, ILL.

Sunday—August 15th—Concurrent Sessions

9:30-10:30 A.M.	"A Review and Evaluation of Verruca Therapy" Dr. Wm. B. Ignatoff, Newark, N. J. "Orthopedic Control in Chiropody" Dr. Harvey Atkinson, Belmont, Mass.
10:30-11:00	Visit Exhibitors
11:00-12:00	"New Advances in Diabetic Foot Care" Dr. Harry Bronston, Detroit, Mich. "Low Voltage With Emphasis on Technique" Dr. Arthur Schultz, Pittsburgh, Pa.
12:00- 1:30 P.M.	Luncheon—Visit Exhibitors
1:30- 3:30	"Pathology and Treatment in Nail Conditions" Cleveland White, M.D., Chicago, Ill. Visit Exhibitors

3:30- 5:30 "New Surgical Approaches in Chiropody"—a panel
Dr. Earl G. Kaplan, Moderator, Detroit, Mich.
Dr. Samuel Korman, Toledo, Ohio
Dr. Louis Newman, Philadelphia, Pa.
Dr. O. E. Roggenkamp, Washington, D. C.
Dr. H. Lee Pearce, Portland, Ore.

"A Simplified Approach in Dynamic Foot Molds"
Dr. Herman G. Pollack, Hartford, Conn.

Monday—August 16th

9:30-11:30 A.M. AMERICAN CHIROPODY CONFERENCE ON ORGANIZATION AND EDUCATION
Dr. William J. Stickel, Moderator, Washington, D. C.

"State Board Problems"
Dr. L. A. Hansen, Kansas City, Mo.

"Effective Use of Visual Aids"
Dr. Marvin W. Shapiro, Toledo, Ohio

"State Evaluation of Practice Standards"
Dr. Felton O. Gamble, Tucson, Ariz.

"Career Guidance for Chiropody"
Dr. Charles E. Krausz, Philadelphia, Pa.

"The Illinois Inter-Professional Council"—a panel
Dr. Stewart E. Reed, Moderator
Pharmacy—Harry E. Levin, R.Ph.
Medicine—Edward A. Piszczek, M.D.
Dentistry—Eric R. Lindholm, D.D.S.
Veterinary Medicine—C. B. Hostetler, D.V.M.
Optometry—R. D. Barton, O.D.
Chiropody—P. R. Brachman, D.S.C.

11:30- 1:30 P.M. Luncheon—Visit Exhibitors

Monday—August 16th—Concurrent Sessions

1:30- 3:00 "A New Concept in Fracture Casting and Orthopedic Management"
Dr. Norbert Ketai, Detroit, Mich.
Dr. Donald Ketai, Detroit, Mich.

1:30- 2:30 "Radiological Manifestations in Bone Pathology"
Dr. Ralph Sansone, Hartford, Conn.

2:30- 3:00 "Preliminary Report of Adhesive Tape Reaction Studies"
Dr. Wm. B. Ignatoff, Newark, N. J.

3:00- 3:30 Visit Exhibitors

3:30- 5:30 "Differential Diagnosis of Vascular Conditions in the Lower Extremities"
R. W. Gifford, Jr., M.D., Rochester, Minn.

7:30 P.M. Official Banquet

Tuesday—August 17th—Concurrent Sessions

9:30-10:30 A.M.	"New Concept in Orthopedic Correction by Use of Felt" Dr. George Weiss, Detroit, Mich. "Importance of Soft Tissue Interpretations in Foot X-Rays" Dr. Ralph Owens, Oklahoma City, Okla.
10:30-11:00	Visit Exhibitors
11:00-12:00	"Injection Therapy" Dr. Harvey H. Haber, Pittsburgh, Pa. "Treatment of Spider Type Varicose Veins by Physical Therapy" Dr. Stanley Landau, Philadelphia, Pa.
12:00- 1:30 P.M.	Luncheon—Visit Exhibitors
1:30- 3:30	"Drugs Used in Chiropody" (With Emphasis on Antibiotics) Dr. Chester Rossi, DuBois, Pa. "A Demonstration of a New Plastic Appliance Technique which Eliminates Positive Casting" Dr. Allan S. Cutler, Cicero, Ill.
3:00- 3:15	Visit Exhibitors
3:15- 4:30	"Business Side of a Profession"—a panel Dr. Bernard C. Egerter, Pittsburgh, Pa. Dr. Jonas C. Morris, Audubon, N. J. Dr. Marvin D. Marr, Cedar Rapids, Iowa

Dr. Earl G. Kaplan, Chairman, N.A.C. Scientific Committee

WOMEN'S AUXILIARY PROGRAM

Drake Hotel, Chicago, Ill.

Saturday, August 14th

12:00- 4:30 P.M.	Luncheon at Kungsholm Restaurant Puppet Show

Sunday, August 15th

8:00 A.M.	Registration Church of your Choice
2:00 P.M.	National Auxiliary Business Meeting Refreshments served

Monday, August 16th

8:00 A.M.	Registration
9:00	Breakfast Speakers: Dr. S. E. Reed Dr. W. C. Gigerich National Auxiliary Business Meeting
2:00- 4:00 P.M.	Tour "Museum Science and Industry" or Tour "Chicago Tribune"

Tuesday, August 17th

Morning Leisure time for shopping
Afternoon Tour "Merchandise Mart"

On your own—the Cubs play Cincinnati Tuesday afternoon at Wrigley Field (double header)—the Drake Hotel is situated near the beaches with play areas for children—endless facilities in Chicago should help to make your visit to Chicago pleasant.

Mrs. Virginia Collet, President
Illinois Auxiliary

ILLINOIS LOCAL ARRANGEMENTS COMMITTEE TO ASSIST AT N.A.C. CONVENTION

Dr. John Collet, President of the Illinois Association of Chiropodists, has announced that the following Local Arrangements Committee will assist the N.A.C. convention director at the coming session which will be held at the Drake Hotel in Chicago, August 12-17, 1954. Dr. Edward Weisman, Chairman, Dr. John Ristvey, Jr., Dr. Frederic B. Streiker, Dr. James L. Hancock, Dr. Robert G. Trowitch, Dr. George R. Gabriel, Dr. Leonard Burroughs, Dr. Howard Crivett.

A PAID VACATION FOR CHIROPODISTS

Did you know that it is possible for you to have a vacation this summer with practically all your expenses paid? In addition it will prove to be an investment that will pay handsome dividends for several years. Through the efforts of the National Association of Chiropodists you can spend your vacation at the beautiful Drake Hotel on Lake Michigan in Chicago, starting August 12th through August 17th, longer stay if you wish. Your transportation by plane, train, or car, your hotel room and your registration fee and a goodly part of your entertainment will be without actual cost to you since these items are deductible from your taxes as convention expenses.

This investment will pay you dividends derived from what you learn at the fine Scientific Program which has been arranged for you. Over twenty outstanding men will present practically every phase of real down to earth material that you will be able to take back to your practice and use to help your patients. This will be a chiropody convention for chiropodists who want to learn how to do a better professional job for humanity.

Besides all this you must consider the value of good fellowship and new friendships you form when you rub (or bend) elbows with other chiropodists. Many a "case" has been opened and reopened and many a patient now walks in comfort with new confidence that his or her chiropodist is the best, as a result of convention buzz sessions.

Come to Chicago for refueling of the old tank of chiropodical knowledge. Let us have the name of your home town paper and we will do our best to give you convention coverage.

Co-Chairmen Publicity Committee

Paul Foster Mahaffey, D.S.C.
1127 South 2nd Street
Springfield, Ill.

Jack Collins, D.S.C.
318 East State Street
Columbus, Ohio

DR. GILBERT RECEIVES NAVY COMMISSION

(LEFT TO RIGHT) Commander Harry F. McCullah, Head, Medical Service Corps Branch, Personnel Division, Bureau of Medicine and Surgery, introduces Ensign Richard S. Gilbert, the first podiatrist to accept a commission in the recently formed Podiatry Section, Medical Service Corps, to Rear Admirial Lamont Pugh, Surgeon General of the Navy.

Ensign Gilbert, son of Dr. and Mrs. William D. Gilbert of 1175 Grand Concourse, New York City, received his commission from an enlisted status. He enlisted in the Navy in June 1952, received Recruit Training and Basic Hospital Corps schooling at the Naval Training Center, Bainbridge, Md., and served as a hospital corpsman at the Naval Hospital, National Naval Medical Center, Bethesda, Md.

A native of New York City, Ensign Gilbert received his B.S. degree from Ohio State University and his degree of Doctor of Podiatry from the Long Island University College of Podiatry, class of 1952.

He is a member of the National Association of Chiropodists and has written a number of articles on his profession. His most recent article, "Foot Survey at a Boy's Summer Camp," appeared in the May 1954 Journal of the N.A.C.

Having recently completed an eight-weeks course of instruction at the Officers Candidate School, Naval Base, Newport, R. I., Ensign Gilbert will report to his new duty station—the Naval Training Center, Bainbridge, Md.—in the near future.

DISEASES OF THE NAILS

C. J. WHITE, M.D.
T. C. LAIPPLY, M.D.
Chicago, Ill.

THE FOLLOWING is a summary of results in 246 cases of nail diseases:

Microscopic Changes

	Number of cases	*Per cent*
Fungi present	148	60.2
Fungi and lepra bacilli present	2	0.8
Psoriasis	25	10.2
Bacterial onychitis	3	1.2
Squamous cell carcinoma	1	0.4
Melanoblastoma	1	0.4
No diagnostic changes	66	26.8

Fungous Infections

The demonstration of fungi in tissue sections is not necessarily diagnostic of fungous infection of the nails. On the basis of repeated biopsies and responses to treatment the following is the evaluation of the significance of fungi in sections:

Negative—no spores or hyphae—96 (39.0%) of 246 cases
Positive infection—occasional subungual spores—28 (11.4%) of 246 cases
Probable infection—many subungual spores—44 (17.9%) of 246 cases
Positive—spores and/or hyphae within subungual keratin or nail plate —78 (31.7%) of 246 cases

Methods of Examination

A comparison of results obtained by the following methods: tissue sections stained by the periodic acid leuko-fuschin technique (Schiff reaction); nail scrapings stained by the leuko-fuschin technique (Schiff reaction); nail scrapings treated with potassium hydroxide; and nail scrapings cultured on Sabouraud dextrose agar; is as follows:

Tissue Section (Schiff Reaction)	80.0%
Scrapings (Schiff Reaction)	46.6%
Scrapings KOH	33.3%
Cultures	33.3%

Tissue sections stained by the periodic acid leuko-fuschin technique (Schiff reaction) revealed the presence of fungi almost twice as frequently as any other method.

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PD-48

EPIDEMIOLOGICAL STUDY OF PLANTAR WARTS AMONG SCHOOL CHILDREN

WALTER K. GRIGG, M.D.
Batavia, Ill.

GERTRUDE WILHELM, R.N.
Dixon, Ill.

An epidemiological study of plantar warts among children attending the public schools in Dixon, Ill., was made by the school authorities and the Lee County Health Department during the school year 1951-52. The purposes of the study were (a) to determine whether or not an epidemic of plantar warts existed, and (b) to attempt to find significant factors in the epidemiology of plantar warts so that recommendations to prevent further spread might be made.

Despite the fact that plantar warts (verruca plantaris) are seen frequently in the general practice of medicine, relatively little has been written about them. The term plantar wart refers to any verruca located on the plantar surface of the feet. These warts may be single or multiple, multiple warts having either a haphazard distribution or that of a large wart with satellites (mother-daughter). The usual plantar wart is a hard yellowish or grayish lesion embedded in a small or large amount of hyperkeratotic tissue. On occasion the keratotic tissue may proliferate so freely that the lesion may be thought to be a callus. A diagnosis of verruca may be made if small black dots are found where the lesion is pared. These black dots represent vascular loops in the papillae of the corium and constitute the core of the wart.

Most plantar warts are presumed to have the same etiology as warts on other parts of the body (verruca vulgaris) (1). When they grow on a pressure point of the sole of the foot, however, most growth must be inward. Severe pain and disability may result, particularly if the plantar fascia is invaded. Possibility of different etiology are the mosaic plantar warts, which are flat and nonpainful and which have irregular outline. Paring of these warts reveals many individual cores, forming a pattern which leads to the term "mosaic." Mosaic plantar warts frequently occur in association with hyperhidrosis (2).

Attack Rate

The feet of all children attending the public schools in Dixon were examined at weekly intervals during the school year 1951-52 by the school nurse and physical education instructors. In a school population of 2,389 students, 107 cases of plantar warts were discovered, an attack rate of 4.47 per cent. For each of the 107 cases, an epidemiology card was prepared and filled out. A statistical analysis of the information obtained from these cards is given in table 1.

As a control measure, it was necessary to determine whether the attack rate in the Dixon schools was an epidemic rate. The school children in the neighboring town of Amboy were therefore examined in May 1952. In a school population of 275, only 2 cases of plantar warts were discovered, an attack rate of 0.72 per cent. The two groups being com-

Dr. Grigg was formerly acting health officer of the Lee County Health Department in Dixon, Ill. Miss Wilhelm is the school nurse of the Dixon public schools.

parable, a difference of 3.75 per cent between the rates represents a standard error of difference of 0.6653 per cent. Thus, the difference is well outside the realm of chance, and it is assumed that an epidemic of plantar warts occurred among the school children in Dixon. It is realized, of course, that a year-long survey of the children in Amboy, such as was conducted in Dixon, might have yielded a greater number of cases and a higher attack rate.

Availability of Showers

No showers were available for the students in the North Central, the Loveland, and the first three grades of the Lincoln and South Central schools. Showers were available for the remainder of the students. A comparison of the number of cases and the attack rate of plantar warts among students taking showers with the number of cases and the attack rate among students not taking showers is shown below:

	Number of students	*Number of cases*	*Attack rate (per cent)*
Showers not available	1,146	27	2.35
Showers available	1,243	80	6.44

The factor of age, however, must be compensated for in interpreting these figures since all students not taking showers were in grade schools, whereas the students taking showers were in both grade and high schools. Therefore, a comparison was made between the two grade schools with shower facilities and the two grade schools without shower facilities omitting the figures for the first three grades (table 2). A ratio of 0.38 exists between the difference in the attack rates for these two groups (0.63 per cent) and its standard error (1.67 per cent). Thus, the difference is so small in comparison with its standard error that showers are neither implicated nor absolved as a causative factor in the epidemic.

Both the Lincoln and South Central schools use foot baths and powder boxes in their shower rooms, and all showers and shower rooms are scrubbed nightly with a strong antiseptic solution. No statement can be made as to the effect that these preventive measures had on the attack rate since there was no group in Dixon with which to compare them.

Incidence by Sex and Age

As shown in table 3, there was a higher incidence of plantar warts among girls than among boys: 59.8 per cent of the cases occurred in girls. The difference between the attack rate for girls (3.48 per cent) and for boys (5.55 per cent), 2.07 per cent, bears a ratio of 2.44 to its standard error, 0.88 per cent. This difference could occur by chance only about 7.3 times in 1,000 and is therefore significant. Watkins also reported a higher incidence of plantar warts in girls, 62.9 per cent (3). No reason for the higher incidence in girls has been determined.

The greatest number of cases for all students occurred at age 15; the greatest number for boys, at age 14, and for girls, at age 15 (see chart).

The epidemiological investigation also revealed the following data: All 107 of the students with plantar warts participated in physical education classes. Thirty-six of these students participated in interscholastic sports; 71 did not. Ninety-three of the 107 students swam in the Dixon swimming pool during the summer; 14 did not.

Incubation Period and Etiology

Investigators have attempted to determine the incubation period of verrucae vulgaris through inoculation experiments on humans. They have found the incubation period to be 1 month, 3 months, 6 months, 8 months, and 20 months. The fact that material from verrucae injected into the normal skin will cause a wart to appear is presumptive evidence that warts are caused by an infectious agent, though no etiological agent has ever been isolated from a wart. Most investigators believe the agent is a virus (1).

As a part of this study a number of specimens of plantar warts were removed surgically and sent to the University of Michigan Virus Laboratory for study. All efforts to isolate a virus proved unsuccessful.

School	*Number of students*	*Number of cases*	*Attack rate (per cent)*
Loveland (grade school)	128	4	3.13
Lincoln (grade school)	719	25	3.48
North Central (grade school)	469	16	3.84
South Central (grade school)	429	22	5.13
Dixon High School	644	40	6.21
All schools	2,389	107	4.47

Table 1. Number of cases of plantar warts and attack rate among city school children in Dixon, Ill., by school, 1951-52.

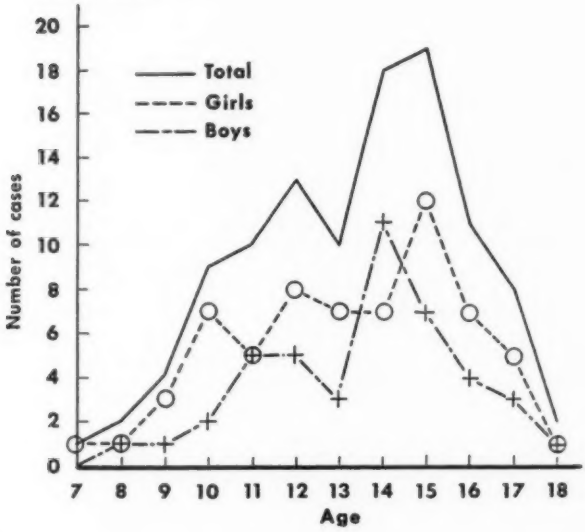
School	*Number of students*	*Number of cases*	*Attack rate (per cent)*
	Showers available		
Lincoln	382	22	5.76
South Central	217	18	8.29
Both schools	599	40	6.67
	Showers not available		
Loveland	38	4	10.53
North Central	293	16	5.46
Both schools	331	21	6.04

Table 2. Number of cases and attack rate of plantar warts among students in grades 4 through 8, according to availability of showers.

School	Number of students		Number of cases	
	Boys	Girls	Boys	Girls
Dixon High School	303	341	16	24
Loveland	66	62	4	0
South Central	234	195	11	11
Lincoln	394	325	4	21
North Central	238	231	8	8
All schools	1,235	1,154	43	64

Table 3. Number of cases of plantar warts, by sex.

Distribution of cases of plantar warts among school children in Dixon, Ill., by sex and age, 1951–52.



Type of Warts and Location

No mosaic plantar warts were found. Seventy-nine students had single plantar warts; 28 had multiple warts. One interesting fact was that 11 students had verrucae on other parts of their bodies. The distribution of these lesions were: hands, 7; arms, 3; and knee, 1. The incidence of verrucae on the body among the general school population was not determined. However, the fact that 10.28 per cent of the children having plantar warts had verrucae on other parts of the body, 91 per cent on

The following tabulation shows the number of students observed in each grade:

Grade	Number of students	Grade	Number of students
Kindergarten	271	7	173
1	177	8	170
2	161	9	213
3	234	10	188
4	180	11	150
5	184	12	117
6	171		

Other Data

The number of cases of plantar warts discovered in each month of the school year 1951-52 were as follows:

Month	Number of cases	Month	Number of cases
(Before July)	3	December	6
July	3	January	10
August	5	February	20
September	5	March	23
October	6	April	17
November	4	May	5

parts that probably would come in contact with the feet, appears significant.

Ninety-three of the 107 patients had one or more verrucae located on a pressure point—base of heel, longitudinal arch, metatarsal arch, or base of toes. This figure is considered significant. Many investigators have previously presented the theory that trauma is a significant factor in the etiology of plantar warts. The locations on the feet were: metatarsal arch, 55; toes, 28; heel, 18; longitudinal arch, 6; and other parts of the foot, 11. (The total of 118 is due to the fact that some children had warts on several parts of their feet.) There were approximately an equal number of warts on the right and left feet.

Group	Number of letters returned	Number of families having other members with warts	Attack rate (per cent)
Families of children with plantar warts	30	7	23.3
Families of children without plantar warts	22	5	22.7

Table 4. Incidence of plantar warts among other members of the families of children having plantar warts and of control group.

Family Members Having Warts

Since plantar warts and verrucae vulgaris are presumed to be infectious, the incidence of warts among other members of the family was investigated. A form letter was mailed to the parents of each student who had plantar warts, requesting that the feet and body of each family member be examined for warts. As a control measure, letters were also sent to an equal number of parents of school children not having plantar warts. The children in the control groups were of the same age and sex and in the same schools as the children with plantar warts. The results of this investigation are shown in table 4. There does not appear to be a significant difference in incidence between the families of the patients and the families of the controls.

Summary

During the school year 1951-52, 4.47 per cent of the students in the Dixon public schools were discovered to have plantar warts. An examination of the school children in the neighboring town of Amboy in May 1952 revealed an attack rate of only 0.72 per cent.

A comparison of schools where showers were not taken with where showers were taken (and foot baths and powderboxes utilized) failed to reveal a significant difference in the attack rates.

Girls showed a higher incidence of plantar warts than boys. The greatest number of cases in boys occurred at age 14; in girls, at age 15.

The incubation period was not determined; the greatest number of cases, however, had their onset in February, March, and April.

Seventy-nine students had single plantar warts; 28 had multiple warts. Eleven of these students had verrucae on other parts of the body. The percentage of school children having verrucae on other parts of the body was not determined, but the fact that 10.28 per cent of the children with plantar warts had warts on other parts of the body is considered to be significant.

Pressure points were the site of 86.7 per cent of the plantar warts. Since trauma would most likely occur on a pressure point, trauma may be a factor in the development of a plantar wart, as has been suggested by many investigators.

Plantar warts are thought by the authors to be related to verrucae vulgaris. Many investigators have shown that material from verrucae can be inoculated into the skin of the same person or other persons and produce verrucae, suggesting that warts are infectious. The University of Michigan Virus Laboratory was unable to isolate a virus from specimens of plantar warts sent to them during this study.

Acknowledgment

The assistance of the following persons is acknowledged: Dr. Charles F. Sutton, Dr. Jackson Birge, and Isabelle Crawford, Illinois Department of Public Health; Dr. Thomas Francis, Jr., and Dr. John Morley, University of Michigan School of Public Health; the principals and physical education instructors of the Dixon and Amboy public schools; and Fern Hicks, Mary Wheatland, and R. G. Thomas, Lee County Health Department.

References

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HOW TO TREAT SMALL SKIN TUMORS

CLARENCE SHAW, M.D.
Chattanooga, Tenn.

In recent years there has been a growing tendency to consider most tumors of the skin as potentially malignant, to recommend—particularly true of the surgeon—that all skin tumors should be surgically excised. No doubt, this attitude has become more acceptable because of the uncertainty of most doctors as to the diagnosis and treatment of many cutaneous tumors. When not sure of the diagnosis, when there is a legitimate doubt, there can be no quarrel with this attitude, but we should protest when this course is recommended for all skin growths. There is no single method for the proper treatment of all small skin tumors. A wide variety of measures can be successfully employed under the proper circumstances.

There are certain basic premises that must be assumed if this approach is accepted. First of all, the physician who treats such growths should be capable of clinically differentiating the common skin tumors. He must also recognize his limitations, since even the dermatologist of widest experience is sometimes in doubt and must enlist the assistance of the pathologist.

Secondly, he must have at his disposal, the personal techniques and physical equipment with which to handle the particular situation, be it surgical excision, electrosurgery or other destructive measures. In cases where x-ray therapy is indicated, the general practitioner should refer the patient to a colleague qualified to use it.

Thirdly, he should have the humility to accept the fact that there is no way which is always best and be willing to individualize each problem.

It is not within the province of this presentation to discuss the differential diagnoses of the common skin tumors. Any standard textbook on dermatology can be used as a guiding reference.

Treatment of Warts

Common warts are very commonly seen. Single warts, except on the sole of the foot, are best treated by electrodesiccation under local anesthesia. The current is held on until the lesion glows, after which the wart is snipped off with scissors, the base curetted and the spark reapplied to control bleeding. Plantar and periungal warts, except the mosaic variety, are better treated with x-rays, freezing with liquid

oxygen or nitrogen, keratolytics, or by thorough curettage under novocain anesthesia, followed by the insertion of a piece of gel foam in the cavity. It is entirely possible to cure single or multiple warts with psychotherapy—a time-honored and legitimate form of treatment. Seldom, if ever, is it necessary to excise a wart except in cases of doubtful diagnosis. Multiple flat warts should not be removed with the electric needle because of scarring. Painting several times a day with full strength Vlemincx' solution will usually melt them away without leaving scars.

Seborrheic Keratoses

Seborrheic keratoses are benign growths which are readily destroyed by superficial sparking with the electric needle followed by curettage. These growths need not be burned deeply. Senile keratoses, on the other hand, are premalignant lesions and must be thoroughly destroyed with the electric needle and the curet. Very early superficial ones may be readily cured by the application of a pencil of dry ice with moderate pressure for 10 to 15 seconds. Ordinarily it is not necessary to cover the treated areas with a dressing.

Small sebaceous cysts are easily excised in toto, especially if they have never been infected. Where infection has occurred, the sac may be adherent and more difficult to remove. In such instances, or for that matter even in the uninfected cyst, other methods may be employed. With the electric needle inserted over the center of the cyst, a weak current is applied which creates an area of necrosis through which the entrapped sebaceous material may drain. The cyst will gradually shrink down leaving an insignificant scar. Another effective method is to incise and drain the cyst, following which a fragment of lunar caustic is inserted into the empty sac and a dressing applied. Three days later the coagulated sac may be lifted out.

Carcinomas

Basal-cell carcinomas should be individualized depending upon their size and location. Small ones may be thoroughly destroyed with the electric needle and curettage, while large ones are best treated by a qualified physician with x-ray therapy or radium. In areas such as the side of the neck surgical excision offers good cosmetic result.

Squamous-cell carcinomas on the extremities should be widely and deeply excised, and careful clinical examination made of regional lymph nodes, for evidence of metastases. On the face they are best removed by thorough electrical destruction if small, and by irradiation if large. In those persons with "farmers" skin, with excessive dryness and multiple lesions, it is probably best to avoid irradiation, since this aggravates the dryness with the possibility of causive new growths later in life.

"Hazards" of Nevi

Perhaps the greatest confusion regarding skin tumors is in the group of nevi. More and more propaganda, emanating largely from the surgeons and oncologists, warns of the hazards of nevi, recommending that, since all nevi are potential malignant melanomas, the only safe way to treat them is to widely and deeply excise the lesion and surround-

ing skin. Nothing could be farther from the truth. All nevi are not potentially malignant and millions have been safely and satisfactorily removed by simply local destruction. It is true that the so-called junction nevus should be completely removed, and that when there is doubt about the exact type of nevus it is best to excise it. But this is the exception.

These statements are based upon a recent survey of treatment of over a million and a half nevi by over 200 experienced American dermatologists. Over 70% use non-surgical destruction, usually electrodesiccation, in at least 90% of the cases while only 7% employ surgical excision in at least 90% of the cases. Occasional mistakes are made, but the incidence is so low (0.0017%) as to show that qualified dermatologists have an excellent batting average. Individualizing each lesion permits safe removal without resorting to surgical excision and pathological examination of every nevus. The obviously benign cellular nevus may be effectively and safely removed by infiltrating the base with a local anesthetic solution, cutting off the tumor level with the skin with either a scalpel or scissors, and sparking or cauterizing the base. If there is reason for microscopic examination, the cut-off portion may be sent to the pathologist.

Too many physicians have been led to believe that melanomas and death can result fom any mole. Such erroneous thinking had led to a great deal of needless surgery and unnecessary fear on the part of both the physician and the patient. It is time to reevaluate our thinking and accept the proposition that there is no one best method for handling all skin tumors.

Clin. Med., Feb. 1954.

TREATMENT OF PERIUNGUAL WARTS

Lawrence K. Halpern, M.D., and Clinton W. Lane, M.D., St. Louis, report that the usual physical and chemical methods for treating sub- and periungual warts are surpassed by 80% monochloracetic acid in aqueous solution and 40% salicylic acid plaster.

The ordinary periungual wart is thin and need not be trimmed with a razor blade. Any overhanging fingernail should be cut away, however. A small amount of monochloracetic acid is applied to the entire surface of the growth with a cotton swab while exercising care that no solution comes into contact with the surrounding skin or beneath the nail. No immediate visual change occurs. A 40% salicylic acid plaster is next applied. This is cut just a little larger than the wart and is taped in place.

When the dressing is removed three to four days later, the wart may "shell out" entirely or be painlessly trimmed with scissors.

Missouri Med. 50:765-766, 1953.

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PLANTAR WARTS TREATED BY INJECTION

A RECENT article by Branson and Rhea[1] in the *New England Journal of Medicine* will undoubtedly stimulate renewed interest in the treatment of plantar warts by injection. This article describes a method consisting of the injection of a procaine solution into the base of the wart, bringing relief of pain and, in a significant majority of cases, effecting cure.

Grund[2], in a letter appearing in a subsequent issue of the same journal, states that he began in 1932 to treat plantar warts by local injection with procaine and a solution of bismuth sodium tartrate. He used procaine only to keep the patient from withdrawing his foot and preventing the introduction of the bismuth at the desired site—the base of the wart. According to this technique, about 1.5 cc. of procaine solution were injected subcutaneously into the tissues adjacent to and beneath the wart. After the onset of anesthesia, another 0.5 cc. of procaine was injected into the base of the wart. Then 5 to 8 minims of a 1.5 per cent aqueous solution of bismuth sodium tartrate were similarly injected into the base. The bismuth was used because cases had been previouly reported in which the intramuscular injection of bismuth had been followed by the disappearance of verrucae in locations distant from the site of the injection[3]. Grund also believed that the bismuth injected locally might exert a sclerosing effect on the small blood vessels usually present in a wart. Five cases had been treated up to 1934, with the plantar warts disappearing after one treatment in four cases and after two treatments in the fifth. All the cases had previously proved intractable to irradiation or excision.

In 1934 Shellow[4] reported the treatment of verrucae by local injections of bismuth sodium tartrate in a series of 73 patients with a total of 97 lesions. Most of these cases had previously been treated by other methods to no avail. Cure was effected in 89 lesions and improvement occurred in five; 67 of the warts were of painful plantar or palmar types, of which 64 were cured, two improved, and one unchanged. Whether or not procaine was used was not stated in this report. Grund states in his letter that he has continued to use procaine and bismuth with excellent clinical results, his cases being numerically similar to those of Shellow.

The possible value of treatment of plantar warts with injections of procaine alone was fortuitously brought to the attention of Branson and Rhea three or four years ago when a soldier with a painful plantar wart desired to march in a special parade. He consulted a surgical technician who injected the wart with procaine to relieve the pain temporarily. The soldier not only was able to march in the parade without difficulty but found a few days later that the wart had disappeared. This unexpected development led Branson and Rhea to try procaine injection as the treatment for plantar warts in a series of 48 patients. The injections relieved symptoms in 95 per cent of the series and cured the warts in 73 per cent. Thirty of the 48 patients were followed for six months, and of these 22 were cured. In seven cases a wart was still present but was asymptomatic. Only one patient failed to show improvement after three injections and in this case the wart was excised. Three patients had extensive warts of the mosaic type, one with about

30 lesions involving the entire plantar surface of the left foot, and all were cured.

Procaine Injected Under Pressure Into Base of Wart

In the method described by Branson and Rhea, 2 or 3 cc. of 1.0 per cent procaine are injected under pressure into the base of the wart in the stratum germinativum of the epidermis. Best results are achieved by using a 26-gauge needle and a Luer-Lok dental syringe for injection under pressure. The authors stress two important points which should be observed in making the injection: the needle should penetrate to the stratum germinativum through normal skin beside the wart; and only one needle puncture should be made because multiple holes permit the escape of the injected fluid and make it impossible to obtain sufficient pressure. Proper placement of the needle results in considerable resistance to the injection, and the desired marked blanching of the skin and elevation of the wart follow the entrance of the procaine. If the needle is inserted too deeply, little resistance to the injection is encountered, no blanching or elevation occurs, and there will be no cure of the wart.

Within 24 hours the patients usually become symptom free; in five to seven days the wart becomes soft and darkened. The wart can generally be lifted out with a thumb forceps after a week if the injection has been correctly carried out. Some cases may require one or two additional injections but the patients are as a rule free from pain. Follow-up care consists of correction of any chronic foot injections that may be present, maintenance of cleanliness in patients with hyperhidrosis, and the wearing of a properly fitted arch support in patients whose warts are under the metatarsal heads.

Relief Prompt; Hospitalization Not Necessary

The treatment of plantar warts by injecting either bismuth or procaine appears to be an eminently effective method of dealing with these painful and often disabling lesions, and is superior to other forms of therapy in that relief of symptoms is prompt, hospitalization is unnecessary, and the patient may continue normal activity. Furthermore, the injection treatment is well suited for multiple warts.

It would be difficult to try to account for the success of the method. Branson and Rhea offer the suggestion that perhaps cure results from ischemic necrosis of the wart, pointing out that good results are not obtained unless marked blanching of the wart occurs along with the elevation caused by the injection. They acknowledge that procaine itself is without therapeutic value in treating the warts, and is used because other fluids which might have the same mechanical effect cause severe pain from pressure for some hours following the injection. Whether bismuth or procaine is the more effective agent is a question which must await the test of time.

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PROPER PROSTHETICS IN CHILDREN'S ARCH CONDITIONS

M. V. SIMKO, D.S.C.
Bridgeport, Conn.

THE flaccid flat foot with advanced pronation in children requires considerable deliberation on the foot practitioner's part before proper procedure is instituted. Symptoms should decide the type of treatment.

It is understood that extreme pronation in children under 8 years of age is quite prevalent. Dr. Richard Schuster reported that the percentage in pronated feet among children was estimated as follows: in toddlers—90%; age 4 to 5—70% age 10 to 16—50%; at age of 20 and over the rate decreased to 1%. Pronation, then should not be regarded too seriously. When the child seems as active as his playmates and reports no pain or serious fatigue, shoes with an extended counter, heel wedging and exercise should provide a solution.

In the weak foot or foot strain conditions which frequently seem to be be the result of a summer in sneakers, the standard leather longitudinal arch brace promises relief. Proper shoes, obviously, deserve consideration. In certain conditions one or two longitudinal strappings suffice, or should precede the prosthetic recommendations.

On the other hand, when the patient complains of fatigue, tires easily in play, and the parent reports the child is irritable, the pronated flat foot requires metal supports. It appears to this writer that metal appliances in flaccid flat feet should not be prescribed too hastily for a child, particularly if the youngster does not complain of foot aches or fatigue.

For a period of six months a one-eighth inch wedge, inside the shoe, might be cemented in the heel, inner border. This leather or chamois wedge is skived down to paper thinness and extends forward beyond the astragaloid joint providing a support as well as a sort of counter for the shoe. Incidentally, a shoe with an extended counter adds to the firmness of the inner wedge.

In rare instances a Whitman brace will cause an extreme toe-in gait. It is advisable to remind the parent to observe the child's walk while wearing the appliances; if the toe-in develops the child should return for an alternative procedure. This condition we believe is likely caused by too much pressure from the outside flange or because the longitudinal elevation is too high.

If relief from pressure and lowering the elevation does not provide results other measures should be pursued. Remove the braces and insert heel wedges as stated above, or extend the heel so that the shoe becomes a wedge style; elevate inner border of the heel one-eighth inch. If child complains of pain and tiredness attention should be given to the conventional arch support with a high inner flange with one spring, and one lateral spring, if the pronation is advanced. Should the inversion persist with this support a thin cross wedge on the external part of the sole at the toe might be tried.

Final instructions include suggestions on exercise by walking on the outer border of the foot with toes contracted. This is the only type exercise recommended in our office since the writer is not too enthusiastic about exercise. We find most children rarely continue this boresome routine.

Corrective shoes, in our opinion, promise little improvement and less relief for pronated or flat feet. Shoes are expensive and are soon worn out of shape or become too short for the growing child. The corrective features of a shoe seldom fit in the proper position to suit various conditions and after considerable wear lose the firmness and supporting features as advertised by the manufacturer.

In conclusion, the chiropodist might consider vitamin deficiency in the treatment of arch ailments in children. Recently it has been noted that certain authorities are suggesting increased dosage of Vitamin D to improve muscular tone in pronated and flaccid foot conditions of the growing child.

One orthopedist maintains, "if these muscles (the inverters of the foot) are atonic and weak it is usually because the entire muscular system is atonic as the result of nutritional deficiency, chronic fatigue or anemia."

Arch plates, then, might well be supplemented not only with proper shoes but with more Vitamin D in tablets or in generous rations of food rich in this special vitamin.

955 Main St.

SCIENTIFIC EXHIBITS AT A.M.A. SAN FRANCISCO, JUNE 21-25, 1954

The following scientific exhibits were displayed at the 103rd annual meeting of the American Medical Association held at San Francisco, Calif., June 21-25, 1954:

"The Conservative Management of Diabetic Foot Complications"

William L. Lowrie, W. E. Redfern, and Brock E. Brush, Henry Ford Hospital, Detroit, Mich.

Most foot complications are preventable by proper care of the feet. Amputation of an arteriosclerotic extremity for infection or gangrene adds stress to the opposite foot, which also has circulatory impairment. By controlling infection, antibiotics permit a safe trial of conservative therapy. The results even in cases in which amputation had been advised have been very encouraging. The progress under conservative therapy of gangrene, cellulitis, and suppurative foot lesions is shown in color. The detailed plan of management is given.

"Common Foot and Leg Deformities in Children"

Charles G. Hutter and Walter Scott, Hollywood, Calif.

The exhibit includes a flexible lifelike plastic model of each type of deformity encountered in everyday practice. Descriptive and common terminology is given. Drawings describing the treatment indicated for each type of deformity are supplemented by photographs of representative clinical material. The deformities included in the demonstration are those of tibial torsion, metatarsal adductus and abductus, and heel valgus. Club foot deformity and other orthopedic conditions requiring specialized orthopedic care are not included in the demonstration except for differential diagnosis.

"Neuropathic Arthropathy of Feet"

Donald S. Miller and William F. Lichtman, Chicago Medical School, Chicago.

This exhibit shows causes of neuropathic feet. The diabetic arthropathy is discussed in detail (more common than heretofore). Other causes as syphilis, spina bifida, myelodysplasia, trauma, alcohol, and leprosy are also mentioned. Charts on diagnosis and treatment are included, as well as wax models of diabetic neuropathic feet, with statement as to features of condition.

CULTURE OF VERRUCA VIRUS

HUMAN VERRUCA VIRUS can be isolated and propagated in chicken embryos. Injection of a ground specimen of verruca vulgaris into the chorioallantoic membrane of a 10-day-old embryo resulted in tissue proliferation, obvious lesions, and pearl-like formations, reports Dr. James A. Bivins of Rutgers University, New Brunswick, N. J. The agent is filtrable through a Berkefeld candle, but not through a Boerner pad, and appears to be slightly susceptible in vitro to Terramycin, aureomycin, and phenylmercuric nitrate, but not to streptomycin.

J. Invest. Dermat. 20:471-481, 1953.

MEMBERSHIP APPLICATIONS

State Society Secretaries and Membership Chairmen are urged to send applications for membership promptly to the N. A. C. Please make every effort to speed up processing the applications.

SEND ANNUAL DUES TO YOUR STATE SECRETARY-TREASURER

The N.A.C. fiscal year ended on May 31, 1954. Dues for 1954-55 were due June first. Members are requested to send their checks to their respective state society secretaries or treasurers immediately.

RESEARCH IN SCIENCE

To plan, direct, and do good research you must frequently think well ahead of existing knowledge. Occasionally it is known to everyone that a great goal has not been reached and the literature may be ignored, but the individual who follows this path more often attains oblivion than fame. When a real advance has been made it is a relatively short time before the weight of interest and ability of other laboratory groups force the originators to share or relinquish leadership. This is as it should be, and there will always be hosts of glittering new problem for those who can never be completely happy unless they are venturing into some phase of the unknown. It is more exciting to tackle a problem and, if fortunate, to enjoy for even a brief space the thrill of a new trail, than to develop well-established fields—but the latter course may be much more productive. As long as an investigator can continue to attract young minds and to keep his own open to the myriad opportunities which lie ahead in research, there is scope—and hope—for him.

C. H. Best, in An. Int. Med., Sept. 1953

EDEMA AND LYMPHEDEMA OF THE LOWER EXTREMITIES

THERE are many "tricks of the trade" in the treatment of edema and lymphedema of the lower extremities. Elevation is of great help. True elevation of the lymphedematous leg really means elevating the foot as high as the neck, because the lymph has to get back into the venous system through the thoracic duct at the neck level. For bed rest, there must be shock blocks under the foot of the bed or a kitchen chair, not simply pillows under the knees. Twelve inches of elevation is average, but greater heights may be required. For bedside sitting the leg must be raised above the hip level. Massage is an excellent method of increasing lymph flow and is entirely safe in the non-inflammatory group. Patients must be reminded also that the motor of the lymph circulation is motion and that the patients must move their feet up and down when they stand still and walk energetically. Another good form of leg exercise consists of bicycling exercises with the legs entirely overhead.

Eugene L. Lowenberg, Virginia M. Monthly 79:351 (July) 1952

LITERATURE

BOOKS, we are told, propose to instruct or to amuse. Indeed! . . . The true antithesis to knowledge, in this case, is not pleasure, but power. All that is literature seeks to communicate power; all that is not literature, to communicate knowledge.

Thomas De Quincey

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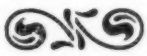

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Manuscripts must be typewritten, double spaced, and an original copy must be submitted. Reference should give name and initials of author, volume, page, month and year of publication in the case of periodicals, and publisher and place and year of publication in the case of books. Illustrations must be clear photographs. Glossy prints are preferred. Drawings must be made in black ink on heavy paper or cardboard. Any illustrations should bear the author's name and be numbered in the order in which they are referred to in the text. Illustrations must not be pasted on the manuscript. Legends should be placed on a separate sheet. Tables are not illustrations and should be numbered separately.

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ABSTRACTS AND HEALTH NEWS

GANGRENE PREVENTED BY PROTECTIVE COATING IN ISCHEMIA OF THE FOOT

AMONG THE problems in managing patients with severe ischemia of the foot is the prevention of gangrene and subsequent amputation. Due to the constant presence of the problem of the ischemic extremity with fragile skin that is on the verge of cracking or breaking down, the need for a substance that will protect the skin is evident.

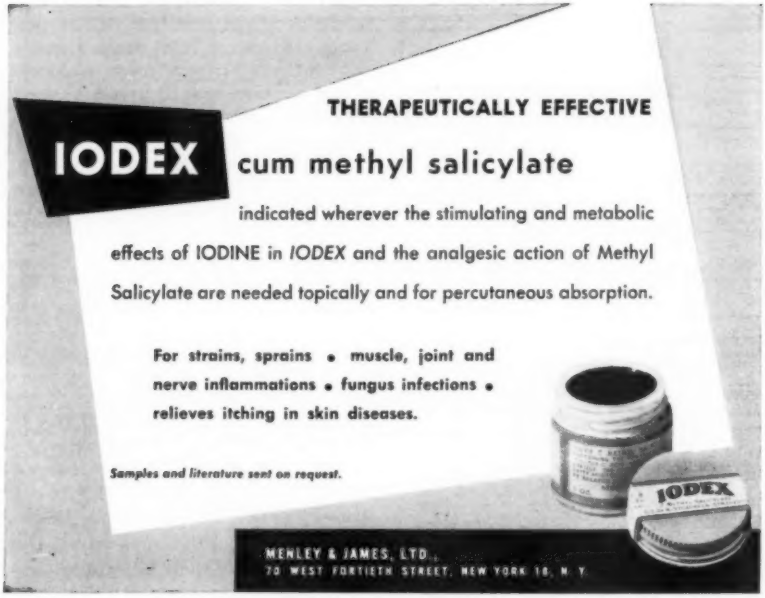
In 120 patients with severe ischemia of the feet, compound tincture of benzoin was used as a protective coating over a period of two years. The sites most exposed to pressure—first and fifth toes and the heels, are the areas that frequently require protection of the skin. About two-thirds of the amputations resulting from arterial occlusions were due to gangrene of the great toe.

The use of compound tincture of benzoin is effective as a protective coating for ischemic extremities, in which gangrene is threatening because of an impending break in the skin. Ointments such as wool fat, cacao butter or olive oil are not protective agents and often do not prevent gangrene. They are of value in softening excessively dry skin. It has been found that a better protective coating is obtained for this purpose if compound tincture of benzoin is used in a more concentrated form than that described in the Pharmacopeia of the United States. The alcohol is permitted to evaporate from the tincture as ordinarily made up until one half of the original volume is left, thus, a more concentrated preparation is available. Evaporation is accomplished by placing 80 to 100 cc. of the compound tincture in a 100 cc. beaker and permitting the alcohol to evaporate spontaneously—it takes from 24 to 48 hours for the volume to be reduced to one half.

J.A.M.A., June 19, 1954, M. Naide, M.D.

THE REWARD OF THE WELL DONE TASK

IN THE first chapter of Genesis is found the story of the creation of the world. There is one line in this graphic description that has always struck me forcibly. When God created the land, and the water, and the heavens, and the grass, and the birds, and the beasts, he viewed each task, and the scripture says: "He saw that it was good." No detail was lacking that might add to the completeness of the whole. What a model for every worker. How much it might mean to every individual if he would perform every task, every duty of life in such a way that at its completion he would be able to say "it is good." Many go through life doing the tasks of each day indifferently. They receive no thrill of accomplishment because they have failed to put into their work sincerity. They have not discovered that there is no pleasure to be found in a task indifferently done. They have not discovered that to the one who performs each task the best he knows how, there comes a satisfaction and a joy of achievement that glorifies the humblest task, and makes of it a satisfying experience. Work so that when the task is finished, be it big or little you can say: "It is good."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USES OF ULTRASONIC THERAPY

SOUND waves with vibrations of high frequency, inaudible to the human ear, may be of therapeutic value in selected conditions, reports George Morris Piersol, M.D. The heat produced by sound waves is more penetrating and can be beamed more accurately than other types of heat.

Benefits appear to arise chiefly from the thermal effects of the waves. Therapeutic significance of nonthermal effects, such as increase of membrane permeability, has not yet been sufficiently assessed.

The waves with a frequency of 1,000,000 vibrations per second are the most useful, since lesser frequencies do not give deep penetration of heat. Equipment designed for the application of ultrasonic energy consists of a high-frequency generator, and an ultrasonic transmitter containing a piezo-electric crystal and electrodes, termed a transducer. In the transducer, electrical vibrations are converted into mechanical vibrations, in turn producing sound waves.

The machine used at high dosage can severely damage many tissues. Therefore, therapy with ultrasonic radiation has definite dangers and limitations.

Ultrasonic radiation will produce sharply localized heating of living tissues and causes selective heating of bone cortex and marrow unlike that from any other source of energy in use for medical diathermy. Ultrasonic application obliterates epiphyseal lines and should not be used over growing bones.

High dosage of ultrasonics has a much greater destructive effect on the spinal cord of dogs than on the peripheral nerves and may severely damage tissue of hair follicles and testes.

Application of ultrasonic waves to the heart or the cervical ganglions may produce abnormal cardiac rhythm. Ultrasonic therapy should not be given to patients with cardiac disease or to pregnant women. Hemorrhage into the eye and detachment of the retina have been reported after this type of treatment.

Despite the disadvantages, the procedure is safe if performed with therapeutic dosage and suitable technics by a trained operator in properly selected cases. The dosage is practically self-limited, since patients feel and complain of considerable pain as soon as dangerous levels are approached.

Although ultrasonic therapy is used for many conditions, benefit is obtained for only a few specific types. The chief indications are arthritis or allied rheumatoid conditions, including myositis, acute subdeltoid bursitis, and fibrositis; diseases of the peripheral nerves, such as neuritis, especially when involving the sciatic nerve, neuralgia, and causalgia; coccygodynia; and pain in phantom limbs. Ultrasonic therapy is also of value in vasopastic peripheral vascular diseases and pyogenic infections of soft parts.

Postgrad. Med. 14:24-32, 1953.

FRACTURES ABOUT THE ANKLE

DIVELEY'S routine in fractures about the ankle is to reduce them at the earliest possible moment and immobilize in a plaster cast. Early weight bearing is highly satisfactory provided firm immobilization of the fragments can be maintained. At the end of two weeks, a heel piece or walking iron may be incorporated in the cast,

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and weight bearing insisted upon. The after-treatment or period of rehabilitation is most important in ankle fractures. At the end of from six to eight weeks, depending upon the severity of the fracture, the cast is bivalved and physical therapy in the form of massage, passive and active exercises with whirlpool is given. In ten days or two weeks, if the x-ray examination shows an adequate union of the fragments, the cast may be discarded and the foot fitted in a strong supporting shoe. Any existing foot imbalance must be corrected by supports and shoe alterations or both.

J. Missouri M.A., June 1951.

TRUTH VERSUS DECEPTION

LEADERS should speak only truthfully. One of the most important points of distinction between democratic and non-democratic leadership is in their respective attitudes to the problem of the political lie. At one end of the scale stand the leaders who make it a conscious principle to utilize the political lie as a method of leadership; in the middle are those who deliberately use political lies only in situations which they define as "crises"; while at the other end are those leaders who steadfastly refuse to use the political lie, even in times which they may judge to be crises. Only the latter of the three classes, according to the framework of this discussion, could be called in any sense "democratic." They alone see that democracy is more than the achievement of a supposedly "democratic" goal: it is, above all, a method for making public decisions. Deception, even if used honestly for what the leader regards as the long-run welfare of society, in effect shifts the making of decisions from the community to the leader, and contradicts the central canon of democracy.

Mulford Q. Sibley, American Perspective, Sept. 1948.

WHAT HE DOESN'T KNOW

WE IN THE medical profession are fully conscious of the difference between doctors. All doctors are not specialists; likewise, all doctors are not general practitioners. In industry there is a tendency to put doctors of all kinds more or less in the same category of "doc." A refinery superintendent often expects an expert opinion from his dispensary physician that should, in reality, come from a university consultant. With the rapid advances that are being made in the field of medicine it is now almost necessary to catalog the efficiency of a doctor from the standpoint of what he is conscious of not knowing, rather than solely from the point of view of his academic attainments. No capable doctor of today need feel chagrined that he cannot answer a given question about one of the more recent advances. He can, however, suffer severe criticism and humiliation if he fails to acknowledge his own limitations and asks for help and guidance when such are indicated.

Med. Bull. S. O. Co. of N. J., April 1951.

HUMAN PERSONALITY AND PUBLIC RELATIONS

PUBLIC relations, as a practical matter, begins with the individual not the public. The foundation of successful public relations is successful personal relations. Success in any business or profession is based, in part, upon a multiple

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Personality is the total impression which an individual makes upon the people around him. One important aspect of personality is character, which may be considered as the moral or ethical aspect of personality. Character evolves from environment, the early setting of habit-patterns which usually do not change. Emotions, also an important segment of the personality makeup, deserve serious consideration, too.

Daniel D. Gage—Public Relations Journal—December 1950.

LANGUAGE

IN IGNORING the relationship between style and content, the formulas have ignored the fundamentals of language. Language is not something we can disembody; it is an ethical as well as mechanical matter, inextricably bound up in ourselves, our positions, and our relations with those about us. It is only the illusion of simplicity that the manipulation of language can win for us. Simplicity comes from discipline and organization of thought, intellectual courage—and many other attributes more hard won than by short words and short sentences. For plain talk—honest plain talk—is the reward of simplicity, not the means to it. So let us not forswear all the richness of our language. Its misuse is not the root ill of our communication problem; it is only the signal of it. And if we make a real effort to win mutual understanding, we need have no fear of the infinite variety of our language—or the ability of our listeners to respond to it. All of which applies to business men no less than to everyone else in our society. When business men have something to say, and mean it, and feel it, their audience will understand.

From The Management Review, December, 1950.

NATIONAL EDUCATIONAL LEVEL

THE educational attainments of the American people are advancing steadily, according to information made available by the 1950 Census of Population. Even though the number of people at ages 25 and over increased by about 12,800,000 between 1940 and 1950, the number without formal schooling declined from 2,800,000 to somewhat less than 2,185,000, or by 22 per cent. On the other hand, the number of men and women with at least four years of college to their credit increased to 5,285,000, or by 55 per cent. A good single measure of the educational progress in the decade is the median number of years of school completed, which advanced from 8.6 to 9.3 among adults aged 25 or older.

Statistical Bulletin 34:9 March 1953.

ORGANIZATION NEWS

WYOMING

AT the annual meeting of the Wyoming Association of Chiropodists held in Cheyenne, the following officers were elected:

President, Dr. John W. Scott; Secretary-Treasurer, Dr. Duane NeuSchultz.

MARYLAND

AT the recent annual meeting of the Maryland Chiropody Association, the following officers were elected:

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President, Dr. V. S. Cantrell; Vice President, Dr. I. H. Samuels; Secretary, Dr. Tobie W. Kleger; Treasurer, Dr. R. J. Hill; N.A.C. Delegate, Dr. J. J. Ostroff; N.A.C. Alternate, Dr. E. J. Kay; N.A.C. Council Member, Dr. J. J. Ostroff.

NEW MEXICO

At a meeting of the New Mexico Association of Chiropodists held in Albuquerque, June 6, 1954, Mr. Paul Robinson, member of the New Mexico legislature discussed proposed changes in the chiropody practice act.

IDAHO

The Idaho Association of Chiropodists held its annual meeting in Boise, May 7-9, 1954. A seminar was presented under the direction of Dr. Gordon Tobin. The next meeting will be held at Jackson Hole, Wyoming, in conjunction with the Wyoming Association of Chiropodists.

ILLINOIS

A regular meeting of the Illinois Association of Chiropodists was held May 19, 1954 in Chicago. Joseph H. Jesser, M.D., discussed "The Diagnosis and Treatment of Allergic Manifestations of the Feet." Announcement was made of the election of Dr. Philip R. Brachman as Secretary of the Illinois Interprofessional Council. Others elected to office in this group were: Harry Levin, R.Ph. of Chicago, President; Ralph Barton, O.D. of Maywood, First Vice President; E. A. Piszczek, M.D. of River Forest, Second Vice President; O. Norling-Christensen, D.V.M. of Des Plaines, Third Vice President; and Eric Lindholm, D.D.S. of Chicago, as Recording Secretary.

KENTUCKY

The Kentucky Association of Chiropodists conducted a refresher course in pharmacy on May 21-23, 1954 at the University of Kentucky Pharmacy School. The course was directed by A. E. Slesser, B.S., M.S., Ph.D. Announcement was made that the Kentucky State Board of Chiropody had become an autonomous body and was no longer directly part of the Kentucky Board of Health.

MICHIGAN

The annual meeting of the Northeastern Michigan Chiropodists Association was held in Flint, June 13, 1954. Dr. T. Ingersoll lectured on "Office Surgery." The following officers were elected: President, Dr. George Barnes; Vice President, Dr. J. W. Cross; President Elect, Dr. Donald Borchard; Secretary-Treasurer, Dr. W. C. Woolgar.

ARIZONA

The Arizona Chiropody Association conducted a seminar in Tucson on April 25, 1954. Dr. Leo N. Liss of San Francisco was the principal lecturer.

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The recently reorganized State Board of Chiropody Examiners comprises the following members: Dr. T. J. Price, President; Dr. Irene Sellers, Vice President; Dr. Howard B. Seyfert, Jr., Secretary-Treasurer.

OHIO

THE Ohio Association of Chiropodists held its annual meeting May 14-16 in Cincinnati. The following officers were elected:

President, Dr. Lon Cooper; President Elect, Dr. Sam Korman; Vice President, Dr. Charles Greiner; Secretary-Treasurer, Dr. Tom Crotty; N.A.C. Delegates, Drs. Charles Greiner and Tom Crotty.

The newly created Executive Board has engaged Mr. Edward Farmer, President of Capitol Associates as Executive Secretary of the Association. Among his duties will be activities concerned with administration, public relations and legislative programs. The new address of the Ohio Chiropodists Association is 17 South High Street, Room 1016, Columbus 15, Ohio.

SOUTH DAKOTA STATE BOARD OFFICERS

DR. EDWARD I. SHINDLER was appointed to the South Dakota Board of Chiropody Examiners by Governor Anderson, who succeeds Dr. Margaret Avery. Present officers of the Board are as follows: Dr. Ann Fylken, President; Dr. H. Valensky, Vice President; Dr. E. I. Shindler, Secretary-Treasurer; Drs. E. Laga and M. D. Scofield, Board of Directors.

NORTH DAKOTA STATE BOARD APPOINTMENTS

IT WAS recently announced that Dr. H. R. Mark of Fargo, No. Dak., has been reappointed for a three-year term to serve on the North Dakota Board of Registration in Chiropody. Dr. T. W. Cockrell of Minot, was appointed to fill the unexpired term of Dr. George D. Westphal. Dr. E. B. Snuff is Secretary-Treasurer of the Board.

DR. LEWIS RECEIVES MEDAL

DR. M. R. LEWIS of Chicago recently received a silver medal of the City of Paris for his lecture in that city in October 1953 on roentgenology. The medal was forwarded by M. Manet, Director of the Institute Podologie. The medal was presented to Dr. Lewis at the banquet following the commencement exercises of the Chicago College of Chiropody on June 4, 1954. Dr. W. A. Danielson, Dean of the school presented Dr. Lewis with a gold key in recognition of his literary contributions to the profession.

CANADIAN MEDICAL ASSOCIATION GIVES RECOGNITION TO PROFESSION

IT WAS recently announced that the Canadian Medical Association at its 87th annual convention adopted a resolution which provides for the granting of recognition to the Canadian Association of Chiropodists and wherein it is stated that chiropody is a practice ancillary to medicine.

OHIO ALUMNI ASSOCIATION TO MEET IN CHICAGO

ANNOUNCEMENT has been made of a reorganization of the Ohio College of Chiropody Alumni Association which is being conducted by a steering committee headed by Dr. Jerome M. Fischgrund of Washington, D. C. Other members

of the committee include Leo Abrams, Ohio; E. J. Alexander, Ohio; J. J. Bates, West Va.; E. H. Buchbinder, Conn.; Rosalie Dikran, Ohio; James Flynn, New Jersey; Earl Kaplan, Mich.; W. Jean McCullough, Pa.; G. D. Scherer, Tenn.; and Don W. Tobin, Texas.

A national membership drive is under way and an election of officers will be held on August 16, 1954 during the N.A.C. convention. The following have been nominated for president: Dr. H. L. Collins, Ohio; Dr. James A. Conforti, Ohio; Dr. J. M. Fischgrund, D. C.; Dr. C. E. Guth, Ohio. Nominees for recording secretary are: Dr. Rosalie Dikran, Ohio; Dr. W. Jean McCullough, Pa. Nominees for financial secretary are: Dr. T. A. Crotty, Ohio; Dr. June Bass Gould, Mich.; Dr. Jesse A. Titus, Ohio.

All members are invited to attend the luncheon which is scheduled for noon, August 16th.

The class of 1929 of the Ohio College of Chiropody held its silver anniversary reunion in Cleveland on June 5, 1954, following the annual commencement.

TEMPLE UNIVERSITY GRADUATION

THE 68TH Annual Commencement Exercises of Temple University were held on June 17, 1954 at Convention Hall, Philadelphia. Hon. Walter Judd, Congressman from Minnesota, delivered the commencement address. One thousand five hundred thirty-five men and women received their diplomas from the university's twelve departments. Dean Krausz presented forty-two candidates to President Robert L. Johnson who conferred the Doctor of Surgical Chiropody degree.

PEDIC RESEARCH SOCIETY OFFERS POST GRADUATE COURSE

AMONG the lecturers and demonstrators who will appear on the program offered by the Fellows Pedic Research Society which is sponsoring a post graduate course October 21-24, 1954 are: Dr. Darwin A. Conley, Tulsa, Okla., who will discuss the results of many years of research in the use of plastic materials; Dr. Joseph Doller, Chicago, Ill., a member of the National Athletic Trainers' Association, whose subject is prophylactic adhesive strapping of the foot and ankle for athletes.

Both of the above speakers will conduct audience participation sessions and every effort will be made to provide individual instruction. Those attending should bring their own scissors.

For further information, write to Dr. E. W. Demeur, 130 South Oak Park Ave., Oak Park, Ill.

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N.A.C. WOMEN'S AUXILIARY

CAN YOU believe that another auxiliary year is about over and that our annual meeting is next month! We look forward to seeing you in Chicago. There is important business to come before the meeting.

Our Luzerne County, Pennsylvania Auxiliary has sent in its contribution of $15.00 for our "talent" fund with an interesting letter from Thelma Gelb about their activities for the year. Lackawanna County, Pa., adds $5.00 to our "talent" fund too. It is good to hear from both of these auxiliaries.

Dr. Rose Stivers, of Louisville, Ky., crocheted a very lovely purse, took it to the Kentucky meeting, raffled it and has forwarded her check for $16.00 for our "talent" fund.

Dorothy Popp, of Cape Girardeau, Mo., used her talent for making luscious pecan pies and has sold them to add $10.00 to our fund. Gracilee Leydecker of St. Louis, who specializes in art and artcraft, made and raffled two beautiful white Chinese trees. Her efforts increase our "talent" fund by $25.00.

Everybody had a wonderful time at the Hobo Party Vera Pearce and Grace Stormont gave in St. Louis. Their check for $33.00 makes a bigger total for our fund and Vera reports more Missouri "talents" have grown and will be turned in soon. Good work!

Miriam Keating, newly elected President of the Washington State Auxiliary, reports a successful raffle

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of a beautiful casserole and has sent in that auxiliary's check for $10.00. Their State convention was a very enjoyable one because of the excellent planning on the part of the auxiliary.

In spite of severe illness, Kathleen Grundy, of South Bend, Ind., managed to add $10.00 to our fund. She reports that Foot Health Week got good publicity in South Bend through radio talks by three of the chiropodists there.

Miriam Aronow, of Los Angeles, reports the establishing of a trophy to be awarded to the California Auxiliary keeping the best scrapbook of publicity received through the year. This should be an inspiration to do more to bring chiropody to the attention of the public. The Long Beach Auxiliary made the State convention there a wonderful experience.

Velma Criswell, of Culver City, Calif., started saving dimes to increase her "talent." When she emptied her bank it made the "talent" fund $15.00 richer.

The Texas Auxiliary's "greenback" coffee at its State meeting found purses wide open and interest high. Thirty-three dollars from the coffee and $20.00 from a raffle of several gifts makes a total of $53.00 from this auxiliary. Thirty minutes of TV time showing the film "Shake Hands With Your Feet" made Houston and vicinity very conscious of Foot Health Week. The new officers of the Texas Auxiliary are Betty Dennis, of Port Arthur, President; Madaline Broude, of Dallas, Vice President; and Wanda Ordile, of Fort Worth, Secretary-Treasurer. Their project this year is the furnishing of a room at the M. D. Anderson Cancer Hospital, the room to carry a permanent plaque of recognition for the auxiliary.

Florence Tiernan, of Rochester,

N. Y., entertained the Monroe County, New York Association and brought about the organization of an auxiliary for that county. They started their activities off with a very successful rummage sale and report work is being done on their "talent" contributions. We are always thrilled to know another auxiliary has become a reality and that more of our women are working for chiropody.

Mrs. J. C. Brown, of New Orleans, adds her bit to our fund too. Helen Taggert, Helen Llorens, Kathryn Gamble and Stella Chapman, all of Shreveport, La., have each donated $2.50 for our fund. These personal contributions are deeply appreciated.

Muriel Block, Secretary of the Florida Auxiliary, reports they have been actively engaged in sewing for the Rose Keller Home in Lakeland. Constance Trice is President of this group and will preside at their convention in Sarasota. Mildred Halton is working with the auxiliary on the increase of its "talent."

The Southwestern Auxiliary's silver tea and style show in Hot Springs was a very lovely affair and the final tally on that will be announced later.

The Minnesota Auxiliary elected the following officers: President, Mrs. Palmer Goulson; Vice President, Mrs. R. Sabbann; Secretary, Mrs. E. W. Chrencik; Treasurer, Mrs. W. Olson; Sergeant-at-Arms, Mrs. J. Frankson.

The final results of our "talent" project will be announced in Chicago. We hope all reports will reach us before then or be turned in at the meeting. The cooperation and help of all of our members has been heart warming and we are, indeed, grateful for your interest.

Margaret Dobbs, President
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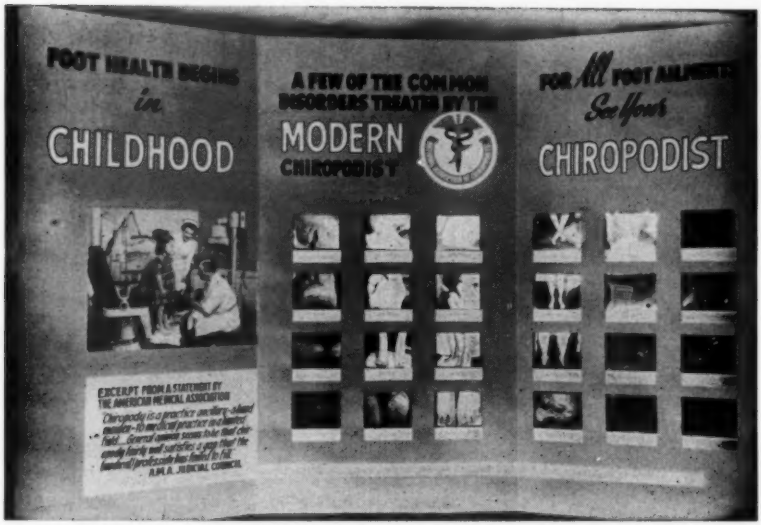

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